



ADVANCED AVIONICS, INC.

# **Installation and Users Guide**

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# Warranty and Warnings

The standard LaserBlast warranty includes all parts and labor for a period of one year from the date of delivery. Shipment to Advanced Avionics, Inc. is the responsibility of the customer. Advanced Avionics will pay for return shipment in the same manner as the item was shipped to Advanced Avionics.

Damage due to excessive abuse is not covered. Examples of such abuse include but are not limited to:

- Pinched wires, cut wires, or broken speakers that result from unauthorized opening of the phaser covers.
- Coiled cords damaged from the vest strap being disconnected or cut from the phaser.
- Battery cables being ripped apart due to not pushing on the release knob on the battery cable on the back of the vest and on the chargers.
- Batteries being dropped on floor
- Batteries being carried by the connector or wires and not by the body of the battery.



## Laser Safety

LaserBlast products comply with CDRH 1040.10 and CDRH 1040.11 regulations governing laser product safety. Do not allow anyone to purposely stare into the laser beam. The LaserBlast laser tag phaser emits visible red laser light, 635nm, approximately 3 mW, but less than 5 mW.

Caution—use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Battery Safety

Please read and follow the following handling instructions. Improper use of the batteries may cause heat, fire, explosion, damage, or capacity deterioration of the battery.

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## DANGER

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1. Do not let leaked electrolyte come into contact with the eyes or skin.

In such a case, immediately wash the area of contact with clean water and seek help from a doctor. If not treated quickly, prolonged contact may cause serious injury.

2. Do not put the battery into a fire. Do not use it or leave it in a place near fire, heaters, or high temperature sources.  
In such a case, the insulator in the battery may be melted, the safety vent and structure may be damaged, or the electrolyte may catch fire, all of which may cause heat generation, explosion, or fire.
3. Do not use, charge, or leave the battery near fire or in a car under the blazing sun.  
Such a high temperature may cause damage of the protecting device in the battery, which may result in an abnormal chemical reaction, and then heat generation, explosion, or fire.
4. Do not charge the batteries with any charger other than the Advanced Avionics, Inc. LaserBlast charger. Use of any other charger may cause heat generation, explosion, or fire.
5. Do not throw or drop the battery.  
Strong impact may damage the protecting device, which may cause an abnormal chemical reaction and result in heat generation, explosion, or fire.
6. Do not disassemble or alter the battery.  
The battery employs a safety mechanism and a protecting device in order to avoid any danger. If these are damaged, heat, explosion or fire may be caused.

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## **WARNING**

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1. Do not use the battery in other than the following conditions; otherwise, the battery might cause heat generation, damage, or deterioration of its performance.

Operating environment;

When the battery is charged: 0°C +40°C (32°F - 102°F)

When the battery is discharged: -10°C +60°C (14°F- 40°F)

When stored less than a month: -20°C +50°C (-4°F - 122°F)

When charged 50%

When stored more than a month: -20°C — +35°C (-4°F - 95°F)  
When charged 50%

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## ⚠NOTICE

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1. Read the instructions of your equipment regarding the battery installation and removal from the equipment so as not to mishandle and waste the battery.
2. Despite being rechargeable, the battery has a limited life span. Replace when usage time between charges becomes short.
3. Nicad, NiMH and Li-Ion batteries should be recycled. Be environmentally conscious - do NOT throw these batteries in the trash.  
If you don't know where your local recycling facility is, call the Portable Rechargeable Battery Association at 1-800-822-8837. They will provide you with the address of the recycling center nearest to you

**WARNING! DO NOT DROP BATTERY!**  
May Cause Damage

**DO NOT** hold the battery by the connector.  
**DO** push the release button to remove battery.  
**DO NOT** pull the battery off the vest or charger.

### **Battery Charger Safety**

Safe operation of the battery charger requires following these instructions:

- Do not put anything on top of a battery charger.
- Allow a 2" space at the rear of the charger for airflow to release heat..
- Only connect Advanced Avionics Inc. Laser Blast batteries – NEVER anything else.
- Always push release button to remove batteries from charger.
- If charger or battery wires are damaged or frayed, discontinue use immediately and call Advanced Avionics for service.

## Basic Caring for the LaserBlast System

The LaserBlast system was designed to require an absolute minimum of care and maintenance. The following is recommended:

- ✦ Clean the outside of the plastics once every 6 months with Windex for the best IR info exchange. A light spray and wipe down keeps the range up on the vests.
- ✦ Condition the Ni-Cad batteries once every 3 months. Leave the batteries in the vests to completely discharge them one night every 3 months. This maintains the optimum life of the battery.
- ✦ Check the chest, back, and shoulder plastics for loose screws every 2 weeks. The equipment is used in a very rough environment and the screws become loose, even with lock washers installed. Tightening or replacing a missing screw prevents equipment failure.
- ✦ Clean off the dust and dirt once every 3 months where you keep the battery chargers. Blow off any dust on the cooling fan of the battery charger.
- ✦ Shut down the computer properly using the proper windows shutdown sequence. Turning off the power without shutting down the windows operating system may corrupt the hard drive.
- ✦ When not in use clip, the phaser to the vest drop strap clip.
- ✦ If the batteries have been on the charger for more that 24 hours with out use—unplug them from the charger.
- ✦ Do not modify the configuration of the LaserBlast computer. Things such as using the LaserBlast screen as wallpaper or disabling the hard drives in the CMOS setup screens cause downtime and lost revenue. Even some screensavers have ended up being the cause of system malfunctions.





✦ We recommend keeping the system computer off of the Internet as viruses can damage your system.

✦ If you have purchased the membership option, the system will prompt you to save your membership database every Monday night. -- Please insert a floppy disk to back up your member information when prompted. This is strongly recommended because there is often no way to retrieve membership data from a failed hard disk.

## Installation of the LaserBlast Hardware

The LaserBlast system was designed to be installed by people with sufficient skill to connect telephone lines, and plug in printers, computers, and monitors. Each LaserBlast system is customized, so your system may not have all of the peripherals and options described in this section of the manual.

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**UNPACKING**

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### Unpacking

Unpack the LaserBlast System and compare it to the Invoice to make sure everything arrived after shipment. Everything is easy to recognize, except possibly the bases, megablasters, scanner, and IR floodlight. These items look alike and are labeled so you can tell the difference.

Your LaserBlast System is shipped with a removable backup hard drive. You should store this backup drive in a safe place. Hard drives are the number 1 cause of system failure and can be easily damaged, even by normal handling. Please treat the spare removable hard drive like you would a fine china heirloom.

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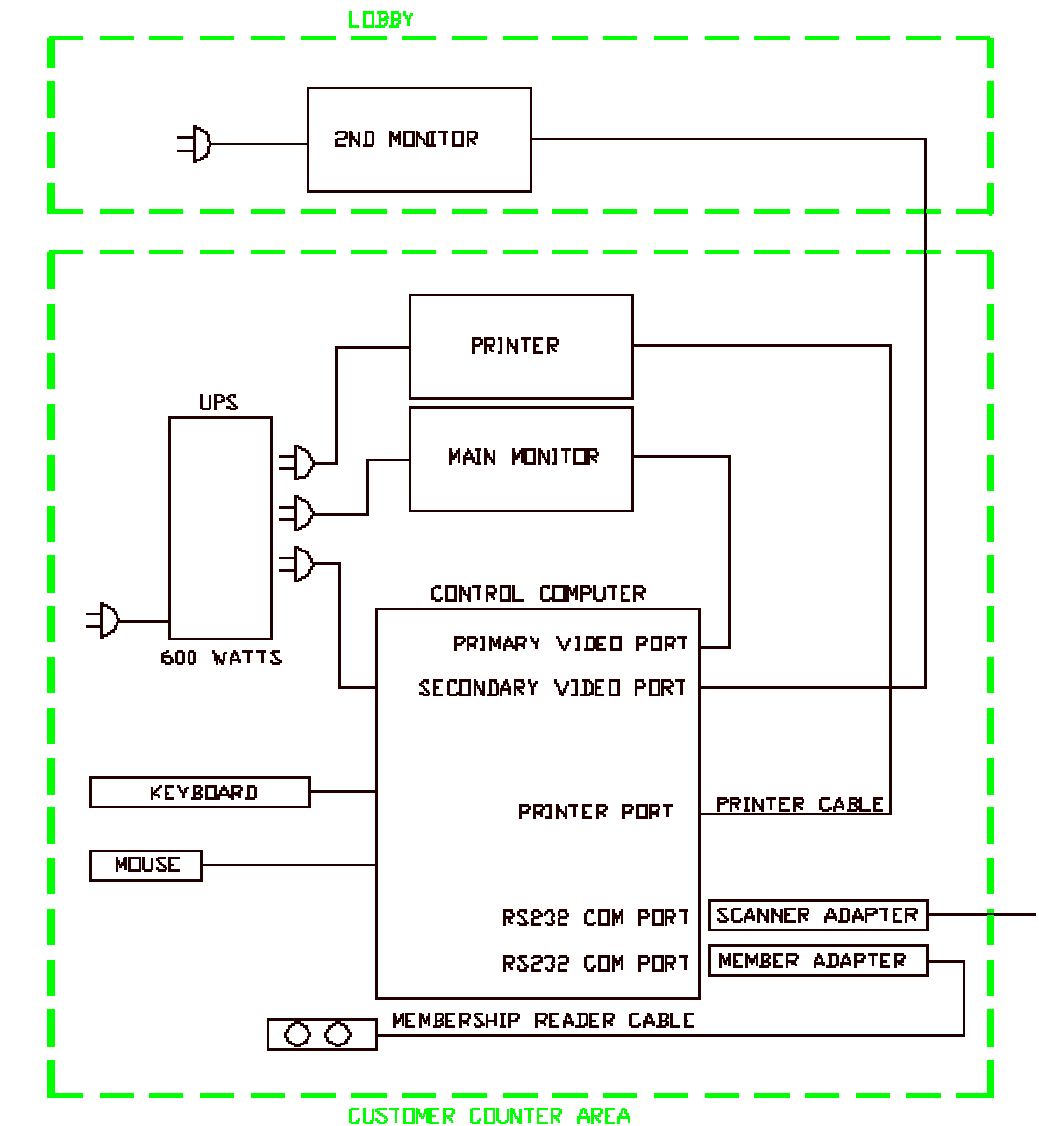
**BLOCK  
DIAGRAMS**

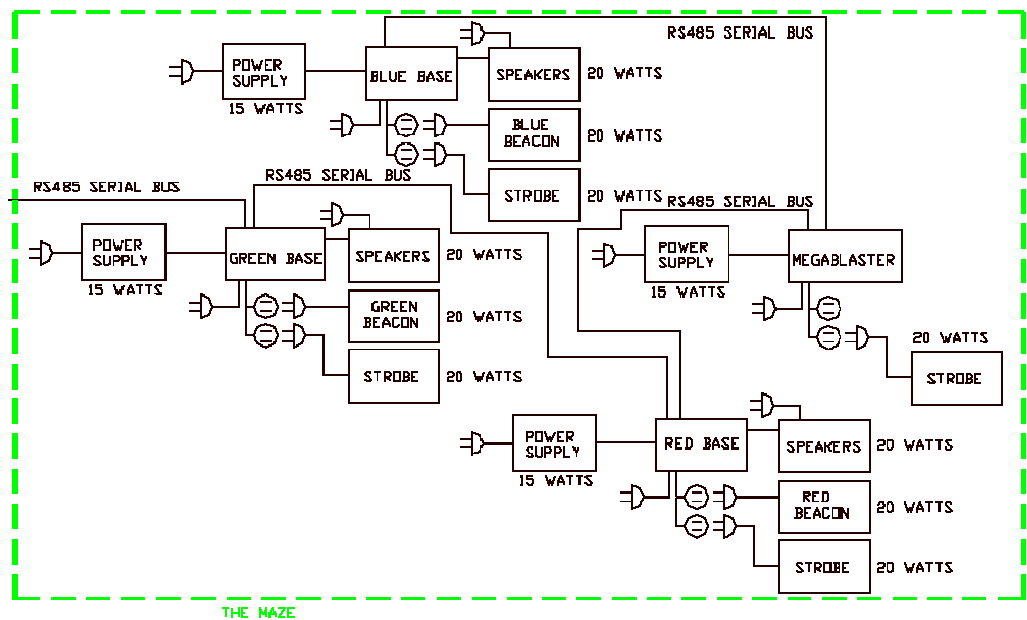
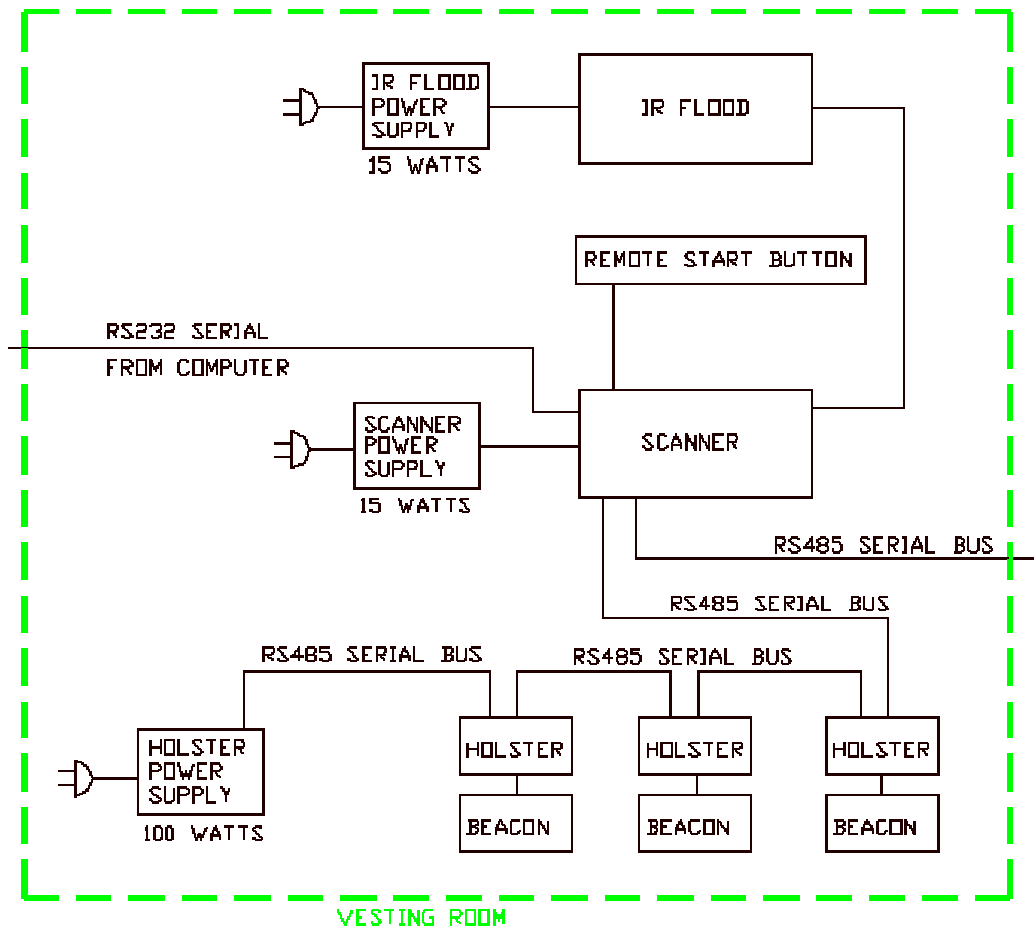
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### General Overview and Block Diagrams

The LaserBlast system is actually very simple to use and install, but it does help to have an overview of the pieces and how they fit together. The following block diagrams show the names of the pieces and the types of cables that connect them. Later sections will describe how to connect them and provide more detailed information, so don't worry.







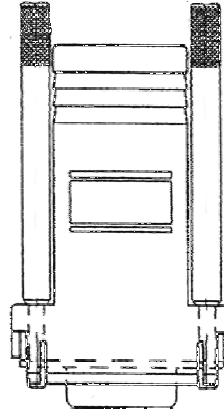
## The Control Computer

Unpack and arrange the LaserBlast control computer on the counter. The control computer is typically located very close to the cash register or managers work area, or main customer counter. Some arenas with mature referees prefer to locate the control computer near the vesting room to make it easier to change game settings, although this convenience can create problems with less mature referees.

Your LaserBlast control computer was preloaded with software and pretested so that all you have to do is place it on a shelf or counter and plug in the following cables:

- ❑ **Printer Cable** - This cable has a 25 pin male connector on the computer side and a 36 pin Centronics style connector on the printer side. The printer comes with instructions from the printer manufacturer.
- ❑ **Printer Power Cord** - Plug the printer power cord (or printer power supply) into a NON-BATTERY BACKED outlet on the UPS (Uninterruptible power supply).
- ❑ **Keyboard** - The keyboard plugs into the connector on the rear of the computer with the keyboard icon on it.
- ❑ **Mouse** - The mouse plugs into the connector on the rear of the computer with the mouse icon on it.
- ❑ **Monitor Power Cord** - Plug the monitor into the monitor power supply and plug the monitor power supply into the battery backed up outlet on the UPS. If your monitor does not have a separate power supply, then plug the main power cord directly into the UPS.
- ❑ **Main Monitor Video Cable** - Plug the 15 pin male video cable into the 15 pin female video connector on the back of the computer. If the system is equipped with a 2<sup>nd</sup> monitor option, then the main video card will be the 15 pin connector closest to the top of the computer.
- ❑ **Computer Power Cord** - Plug the computer into a battery backed up outlet on the UPS.
- ❑ **UPS** - The UPS provides power monitoring, battery backup, and surge protection for the control computer and accessories plugged into it. Most of the UPS's used by LaserBlast have 3 outlets that are battery backed up, and 3 outlets that are only surge protected. Plug the UPS into a suitable 110 VAC outlet. The UPS also has an on/off switch. Once everything is plugged in, turn the UPS on and leave it on. Use the switches on the individual computer, printer, and monitor to turn them on and off. Do not turn off the computer, printer, or monitor using the UPS switch.

- ❑ **Scanner Serial Port** - Plug the Scanner Serial Port adapter into a 9 pin male serial port on the back of the computer. This 9 pin female to 6 pin RJ12 telephone wire adapter is shown below: Typically, COM1 is assigned to the scanner serial port and it is located next to the keyboard and mouse port on the back of the computer. Use the thumbscrews to attach the adapter securely to the computer.



- ❑ **Audio Output Cable** - to Arena amplifier. This cable is used to feed your audio amplifier and maze speakers with game messages, MP3 music (software option), or CD music. Plug the 1/8" stereo jack into the green audio connector (Speaker Out) on the back of the computer.

Connect to Audio Mixer Input (Supplied by Audio company)



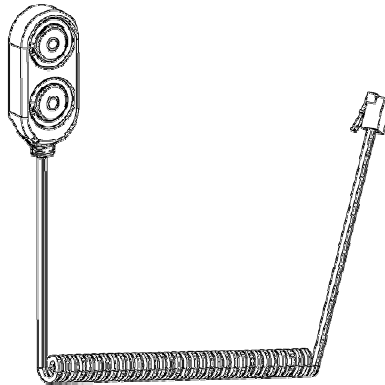
Connect the 2 RCA connectors to the Audio Mixer (Usually not supplied by LaserBlast) using an RCA extension, if required, shown below.



- ❑ **2nd Monitor** - (Optional) Connect the 2<sup>nd</sup> monitor to the computer using the 15 pin male/female extension cable. The 2<sup>nd</sup> monitor video card is usually the video connector closest to the bottom of the computer.
- ❑ **Membership Serial Port** - (Optional) Plug the membership adapter into a 2<sup>nd</sup> serial port connector on the back of the computer. The membership adapter is shown below. Use the thumbscrews to secure the adapter to the serial port.



Plug the membership button cable into the Membership Serial Port Adapter, shown below. Find a convenient place to stick the reader, peel the adhesive liner off the back, and press the cable into place.



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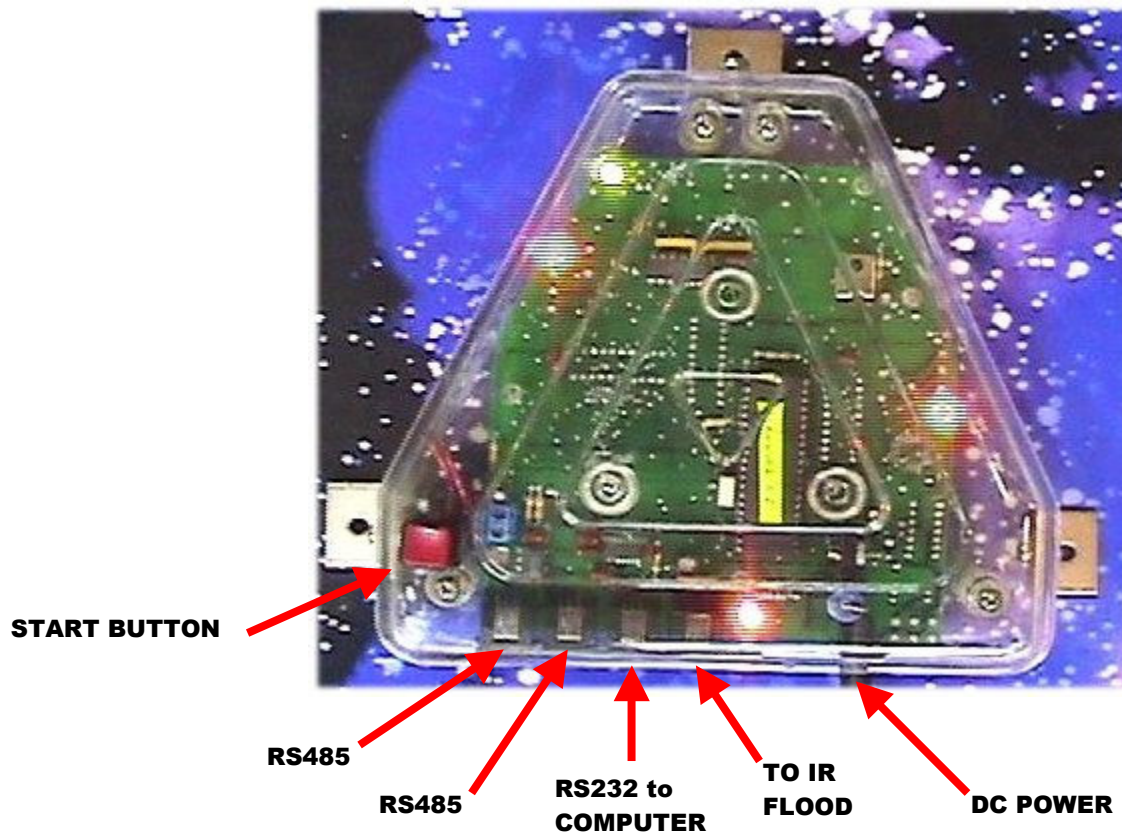
## THE SCANNER

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### The Scanner

The Scanner is an electronic module, mounted in the vesting room that performs several functions. It acts like a traffic cop and coordinates all of the Infrared Light and electrical signals between the bases, megablasters, vests, computer, and any holster electronics. It also acts as a housing for the “START GAME” pushbutton.

## THE SCANNER



Select a location to mount the scanner to a wall in the vesting room. The location should be within 5 feet of a power outlet and 5 feet from the floor. It is also important for the scanner to be located near the door between the vesting room and the maze so that the referee can make sure that people pause as the scanner reads the data out of each vest as they re-enter the vesting room after the game (otherwise known as “scanning in”).

Once a suitable location has been found, anchor the scanner to the wall using 3 drywall screws in the outer brackets.

Don't plug the scanner power supply into the wall outlet at this time.

Make and route a 6-conductor phone line between the scanner and the computer. Make sure that the RJ12 connectors are oriented the same on both sides of the wire. Secure the phone line to the wall, being very careful to avoid putting staples through the phone line. Make sure to leave enough slack in the line to allow you to position the control computer where you want it.

Make sure the computer is turned off, and plug one end of the phone wire into the scanner connector (2<sup>nd</sup> connector from the right, see photo) and the other end into the scanner serial adapter already mounted on the computer.

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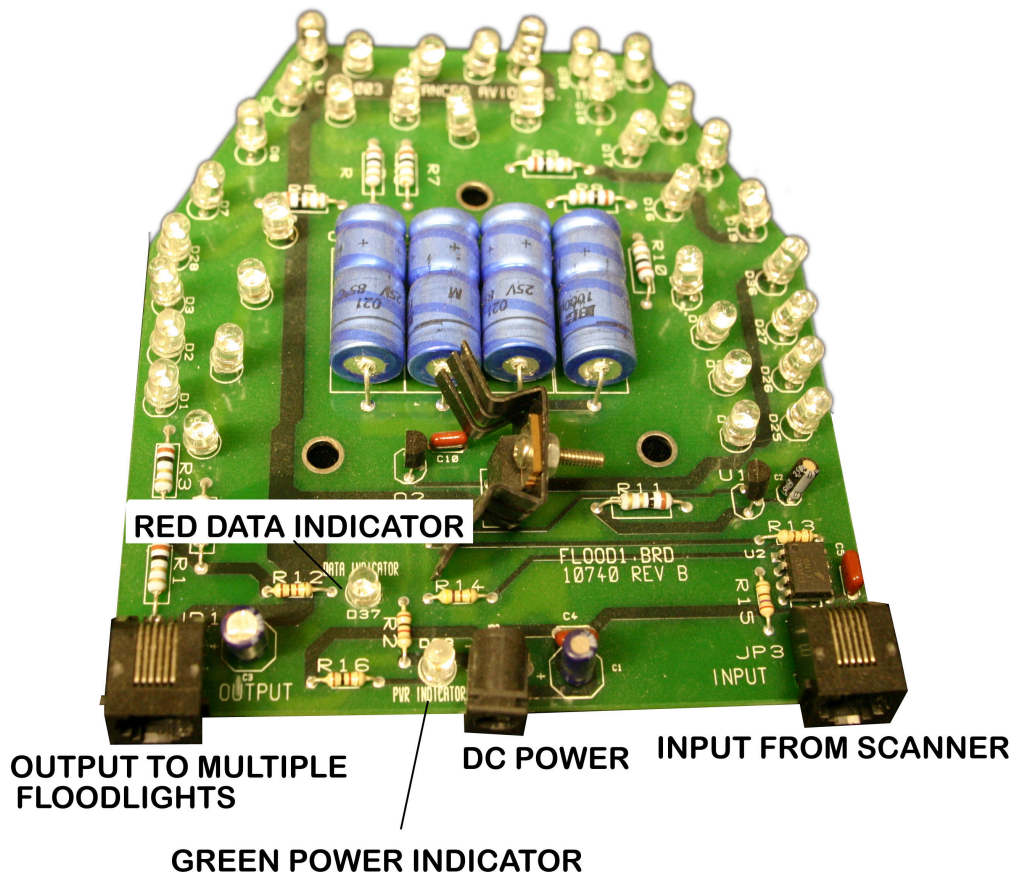
## THE IR FLOOD

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### The IR Floodlight

The IR Floodlight is an electronic module, mounted in the vesting room, which transmits infrared signals from the scanner to the vests at the beginning of the game, and at the end of the game. The scanner contains 1 IR emitter, so it will communicate to the vests without an IR Floodlight, but the IR Floodlight contains 40 IR emitters. These 40 IR emitters eliminate shadows in the vesting room and allow error free communication with the vests.

### The IR Floodlight



The proper location of the IR Floodlight is vital to a successful installation. It needs to be located high on a wall, or on the ceiling so that the IR light can spread out over a crowd of people. There must also be a power outlet within 5 feet of the IR Floodlight. The IR Floodlight also should be within 15 feet of the scanner.

Once you have found a location that meets these criteria, mount the IR Floodlight using drywall screws and the 3 brackets. Remove the cover of the IR Floodlight and carefully bend the IR LED's so that they aim in the general direction where the players will be. Do NOT bend them more than once, or they may break.

Make and route a 6-conductor phone line between the scanner and the IR Floodlight. Make sure that the RJ12 connectors are oriented the same on both sides of the wire. Secure the phone line to the wall, being very careful to avoid putting staples through the phone line. Go ahead and plug the new phone line between the IR Floodlight (using the right most connector) and the scanner (also using the right most 6 pin connector). See photos for connector identification. The green power LED should light when you plug the IR Floodlight in. The RED data indicator will only light when the Scanner is sending data.

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## THE BASES

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### The Bases

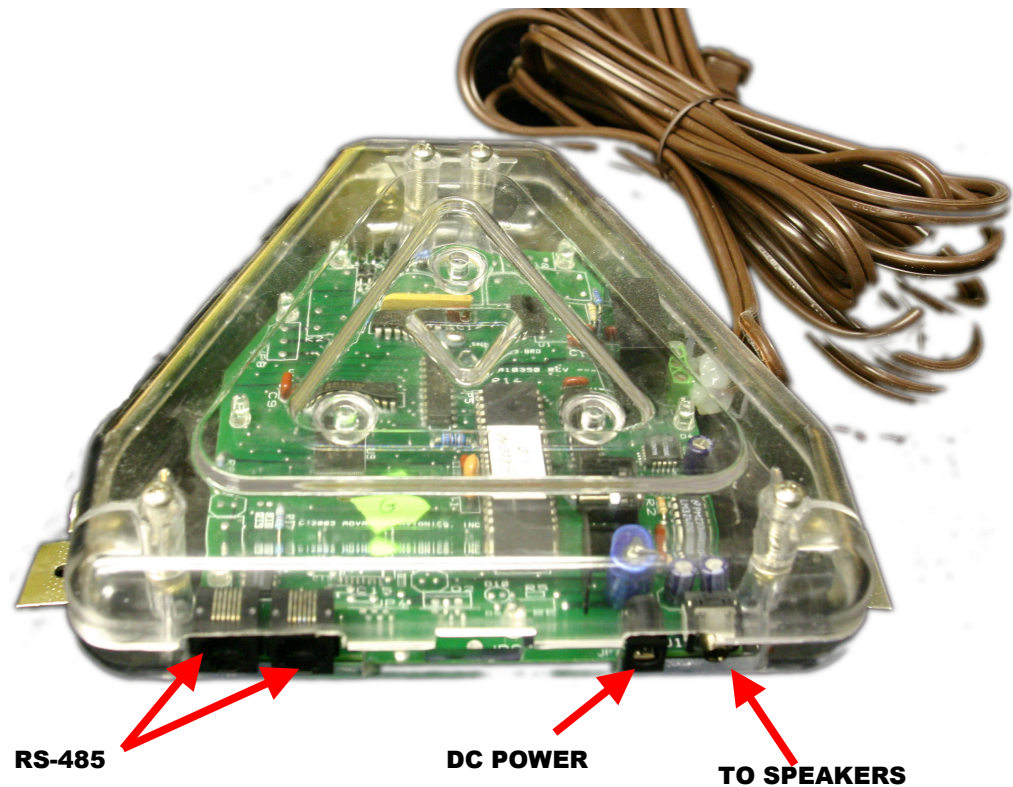
The bases consist of an electronic module, a set of speakers, a police beacon, and a strobe light. The module, the speakers, the police beacon, and the strobe light come pre-connected on a 2' x2' wood platform. This platform can be suspended from the ceiling, or mounted to any base structure that you desire.

Once the base has been mounted to the ceiling or structure, all you have to do is plug in the 3 power cords, 1 for the DC power module for the base controller, 1 for the police beacon/strobe and 1 for the speakers.

The bases need to be connected to the scanner through a 6-conductor phone wire. There are 2 phone jack connectors on each base to allow you to "daisy chain" the bases to each other to complete the connection to the scanner. The scanner also has 2 connections to allow you to route the phone lines to 2 bases directly. The bases, scanner, and megablasters don't have to be connected to each other in any particular order; it is only necessary that each device make it back to the scanner somewhere along the chain.



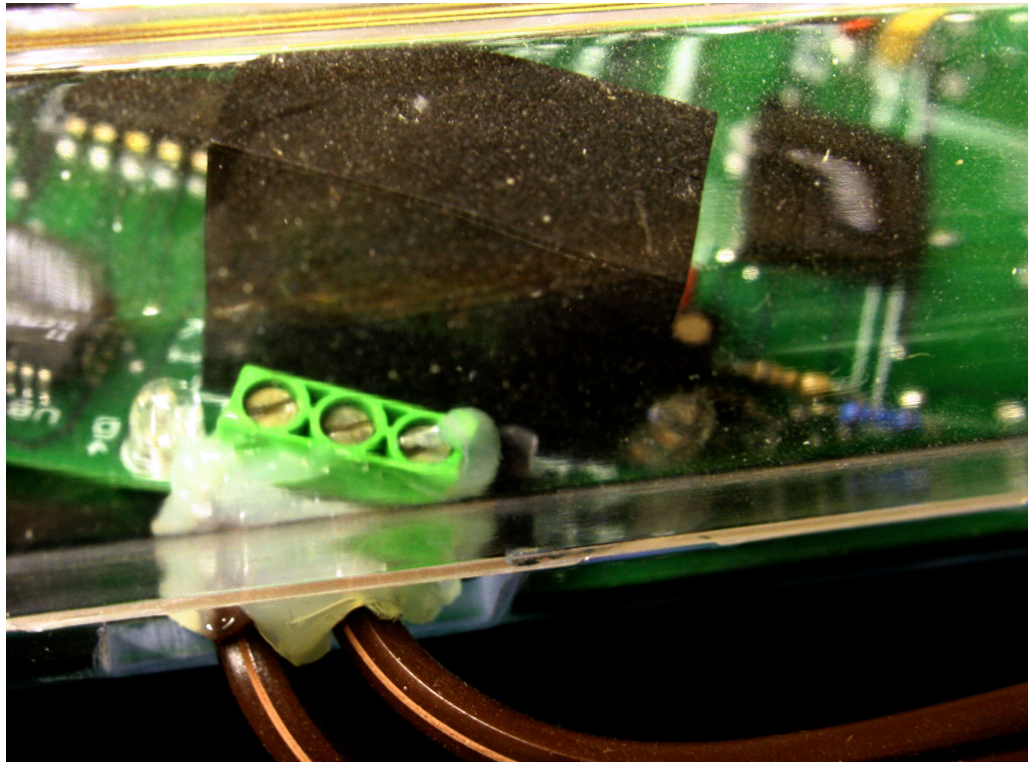
## The Base Control Module



After the bases are mounted, and the phone lines have been run back to the scanner, go ahead and plug the bases into the AC power outlet. The police beacon, strobe, and speakers should all activate for about 2 seconds after power up. If they do not activate, then make sure that the switches for each are turned on, the speaker volume is adjusted, or the strobe speed is not turned all the way down. Adjust the speaker volume and the strobe speed. Do not adjust the strobe speed too fast because it will interfere with the IR data transfer if set too fast.

The base stores 512Kbytes of wave file sound effects. These sound effects can be modified for whatever theme you would like. See the section under “Software Bells and Whistles” for details. They are originally shipped with standard sounds already programmed.

The special effects relay (contained in the base) is pre-wired to an extension cord. The relay acts as a switch to turn on special effects for a few seconds when the base has been hit. The amount of time that the relay is on can be controlled by the main computer. The relay is only capable of switching 10 amps maximum, so make sure you never plug anything into the relay extension cable that draws more than 10 amps.



## The Base Relay Connection

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### THE HOLSTERS

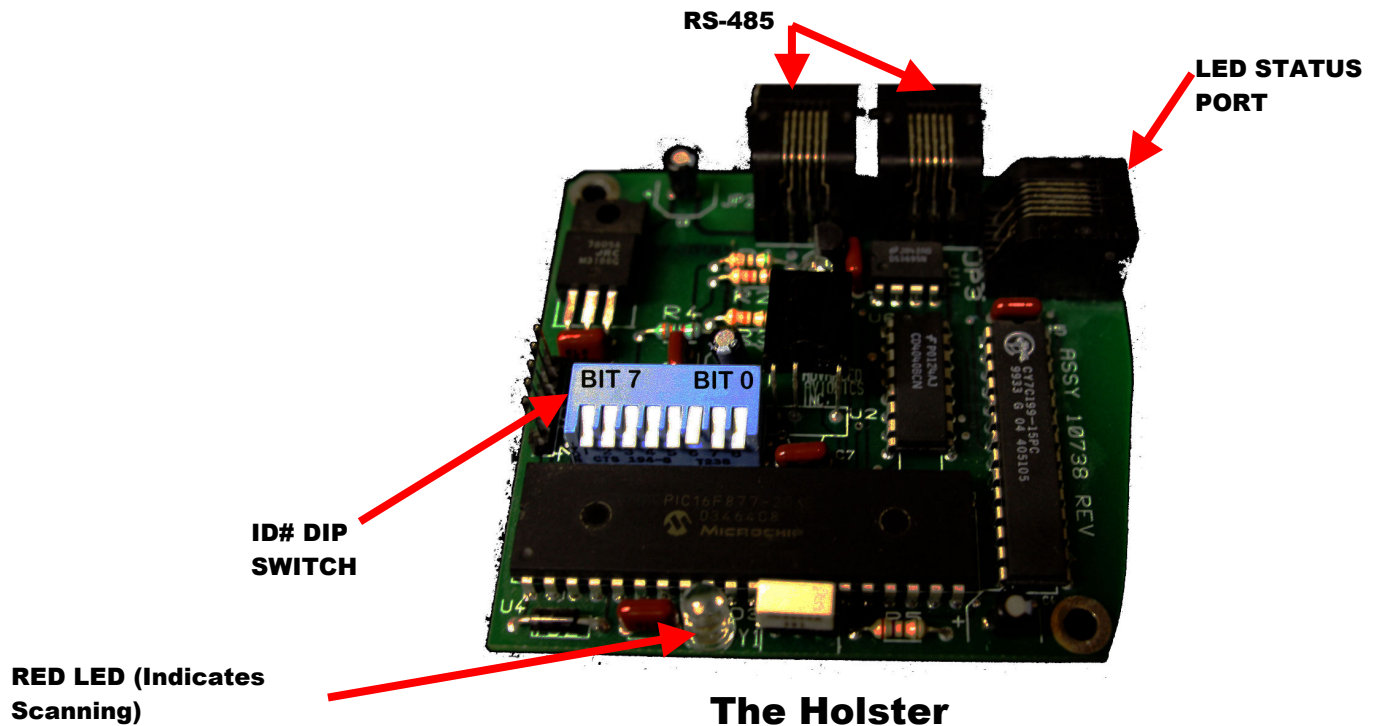
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### The Holsters (optional)

The holsters provide an optional way to scan in the game data at the end of the game. If your system includes holsters, all you have to do is hang up each vest at the end of the game, and the holster automatically reads the data into the computer.

To install a holster system, follow these steps:

1. Make sure each holster has a unique ID#. The ID#'s are set using the 8 position DIP switch shown on the following photo. The holsters should be set to the correct number at the LaserBlast factory, but if you ever have to replace a holster circuit board, you will have to make sure that the ID# of the replacement board is the same as the one you are removing.



Start numbering the holsters with #16 and go up by 1 on each adjacent holster.

### **HOLSTER ID# TABLE** (On means down)

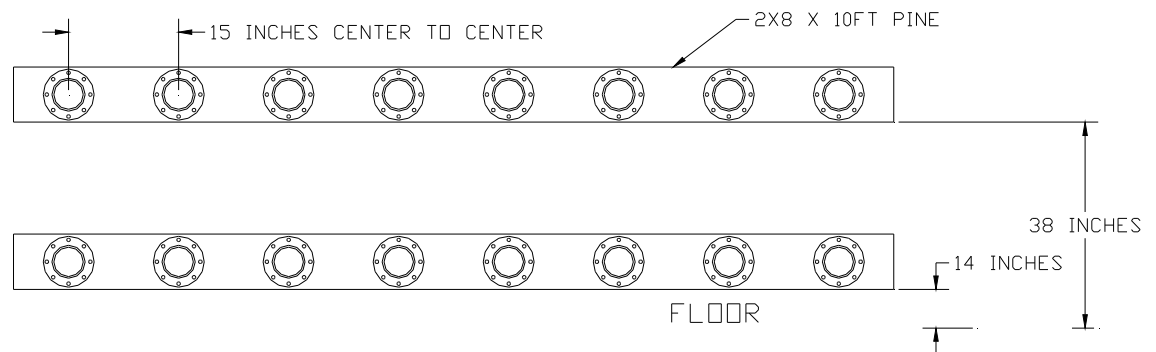
ID#	Bit 7 LED D2	Bit 6 LED D3	Bit 5 LED D4	Bit 4 LED D5	Bit 3 LED D6	Bit 2 LED D8	Bit 1 LED D7	Bit 0 LED D1
16	On	On	On	Off	On	On	On	On
17	On	On	On	Off	On	On	On	Off
18	On	On	On	Off	On	On	Off	On
19	On	On	On	Off	On	On	Off	Off
20	On	On	On	Off	On	Off	On	On
21	On	On	On	Off	On	Off	On	Off
22	On	On	On	Off	On	Off	Off	On
23	On	On	On	Off	On	Off	Off	Off
24	On	On	On	Off	Off	On	On	On
25	On	On	On	Off	Off	On	On	Off
26	On	On	On	Off	Off	On	Off	On
27	On	On	On	Off	Off	On	Off	Off
28	On	On	On	Off	Off	Off	On	On
29	On	On	On	Off	Off	Off	On	Off
30	On	On	On	Off	Off	Off	Off	On
31	On	On	On	Off	Off	Off	Off	Off
32	On	On	Off	On	On	On	On	On
33	On	On	Off	On	On	On	On	Off
34	On	On	Off	On	On	On	Off	On

35	On	On	Off	On	On	On	Off	Off
36	On	On	Off	On	On	Off	On	On
37	On	On	Off	On	On	Off	On	Off
38	On	On	Off	On	On	Off	Off	On
39	On	On	Off	On	On	Off	Off	Off
40	On	On	Off	On	Off	On	On	On
41	On	On	Off	On	Off	On	On	Off
42	On	On	Off	On	Off	On	Off	On
43	On	On	Off	On	Off	On	Off	Off
44	On	On	Off	On	Off	Off	On	On
45	On	On	Off	On	Off	Off	On	Off
46	On	On	Off	On	Off	Off	Off	On
47	On	On	Off	On	Off	Off	Off	Off
48	On	On	Off	Off	On	On	On	On
49	On	On	Off	Off	On	On	On	Off
50	On	On	Off	Off	On	On	Off	On
51	On	On	Off	Off	On	On	Off	Off
52	On	On	Off	Off	On	Off	On	On
53	On	On	Off	Off	On	Off	On	Off
54	On	On	Off	Off	On	Off	Off	On
55	On	On	Off	Off	On	Off	Off	Off
56	On	On	Off	Off	Off	On	On	On
57	On	On	Off	Off	Off	On	On	Off
58	On	On	Off	Off	Off	On	Off	On
59	On	On	Off	Off	Off	On	Off	Off
60	On	On	Off	Off	Off	Off	On	On
61	On	On	Off	Off	Off	Off	On	Off
62	On	On	Off	Off	Off	Off	Off	On
63	On	On	Off	Off	Off	Off	Off	Off

2. Each holster needs to be connected to the holster power supply through a daisy chained connection of 6 wire RJ12 telephone wire. Do not exceed 10 holsters per daisy chained connection, preferably no more than 5. For more holsters, simply run a 6 wire phone cord all the way back to one of the six holster power supply outputs.
3. Mount an LED status module above each of the holsters as shown in the following photo. Connect each LED status module to the holster using a 6 wire phone cord.



4. Mount (2) black 2x8 pine boards securely to the wall according to the following diagram. The top board is used to mount the vest holding rack and the bottom board is used to mount the holster electronics.



5. After all holsters have been connected to each other, and then to the power supply, you still have to make a connection to the RS485 port on the scanner. This can be from the end of one of the holster daisy chains, or it can also be from an unused connection on the holster power supply.
6. To test the holsters, click on the “Test Holster” button on the maze devices menu. The red LED on the holster circuit board should go on and then off every few seconds. If not, then there is most likely a bad telephone wire. In order to locate the bad wire, remove half of the holsters at a time until the problem is found. Make sure that you unplug the holster power supply before you connect or disconnect any telephone wire from any holster. You may get lucky and not damage a holster if you unplug it with the power applied, but it was not designed to be “hot swapped”. Please turn off the power every time you connect or disconnect a holster telephone cord.
7. You can verify the ID#’s are all unique by clicking on the “Query Devices” button on the Maze Devices Screen. Each LED status beacon should show a different pattern of red LED’s. Each beacon has 8 red LED’s, and they will show the values of the each of the DIP switches.

## **Installation of the LaserBlast Software**

### *Minimum PC Requirements*

The LaserBlast software requires a dedicated computer with at least:

- 1) 400 Mhz processor
- 2) 1 RS232 serial port for the scanner
- 3) 1 RS232 serial port for membership (if membership is desired)
- 4) 600 x 800 main monitor video card and monitor
- 5) 600 x 800 2<sup>nd</sup> Monitor video card and monitor (if 2<sup>nd</sup> monitor is desired)
- 6) CD-ROM for software loading
- 7) 2<sup>nd</sup> Removable Hardrive for backup (strongly recommended)
- 8) Windows XP Home or Professional Edition
- 9) 128 Mbytes of RAM minimum
- 10) Sound Card

The LaserBlast software is distributed on a CD. The steps to install the software on your PC are listed in the file called ReadMeReleaseNotes.txt on the CD. These instructions are kept up to date as improvements and new features are added, so we will not repeat them here in this manual. Double click on this file and follow those instructions.

## Basic Game Play using the LaserBlast System

This section of the manual describes the basic operation of the LaserBlast system and everything you need to know to start and stop games, scan the data in at the end, and print score sheets.

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### GAME MODES

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### Game Modes

The LaserBlast System is setup to run games all day long with very little operator interaction. The system consisting of the computer, the scanner, and the vests move between the following modes.

- 1) Waiting mode
- 2) Game Playing Mode
- 3) Scanning Mode

When the system is first turned on, the computer, the scanner, and the vests are all in **Waiting Mode**. In this mode the game clock is “00:00”, the vest LCD’s all say “LaserBlast”, and the scanner has 2 LED’s chasing themselves.

In order to start a game, you can either click on the “START” button on the screen, or push the start button in the vesting room. Either of these actions causes the computer to send the game setup information to the scanner and enter **Game Playing Mode**. The computer starts the game timer, and the scanner sends signals to the IR Floodlight that cause the vests to start the game. The IR Floodlight will send the start game command to the vests for 20 seconds. You can verify that the scanner received the start game command because it switches to 3 LED’s chasing themselves while it broadcasts the start of game information. Part of the game information that is broadcast to the vests includes the length of the game, so the vests know when the game is over.



You can verify that the vests received the “start game” command because their large yellow LED on the chest will blink and their LCD’s will say “HIDE” and countdown the time before activation.

When approximately 3 minutes has elapsed on the game counter, any vest that does not have its trigger pulled will automatically switch from **Game Playing Mode** to **Waiting Mode**. This allows the next group to put the unused vests on while the previous game is still going on.

When the computer game clock counts down to “00:00”, the computer enters **Scanning Mode**, as well as sends a signal to the scanner to switch to **Scanning Mode**. The vests end the game automatically and they also enter **Scanning Mode**. You can verify the computer is in Scanning Mode because the game clock will be “00:00” and the 2<sup>nd</sup> button down on the right side of the screen will be labeled “FINISH”. You can verify the scanner is in **Scanning Mode** because there will be 4 LED’s chasing each other. You can verify that the vests are in **Scanning Mode** because their large yellow LED will be on, and their LCD will say the vest name and how many hits they have.

During **Scanning Mode**, have each player aim their phaser in the general direction of the scanner and pause before hanging their vests up on the rack. They don’t have to pull the trigger, or aim very accurately. The scanner will grab the game data out of the vest in about 1 second, the vest will say its name, and the large yellow LED will go out. As each vest is scanned in, it will show up on the main screen of the computer. Make sure that all of the players have scanned in, and that none of the large yellow LED’s on the vests are still lit.

After you are sure that all players have scanned in, click on the “FINISH” button on the computer screen. This will cause the scanner to exit **Scanning Mode**, and the computer will calculate the game scores and print the score sheets. At this point, the computer, the scanner, and the vests are all back in **Waiting for Game** mode.

This is all you have to know to run basic games. Probably the #1 cause of confusion and frustration for new LaserBlast system owners occurs when the vests, the computer, or the scanner get in different modes. This can happen for various reasons; such as the owner wanting to change the game setting right after a game has just begun. If you click on the “ABORT” button, the vests are still in Game Playing Mode, and the computer and scanner are in Scanning Mode. Once a vest has begun a game, the only way to change the game settings is to unplug the battery and plug it in again, and then restart the vest with the new settings, or use the terminator (explained later) to reset the vests.



## The Terminators

The LaserBlast System is provided with referee terminator devices. These devices serve 2 functions when the system is in **Waiting for Game Mode**, and 2 different functions when the system is in **Playing Game Mode**. The functions are selected by either placing your hand under the reflective sensor in the front of the phaser, or not.

## Functions of “The Terminator”

	Hand on Sensor	No Hand on Sensor
<b>Waiting for Game Mode</b>	Aim directly at shoulders and hold for 3 seconds to start a default 15 minute game. This is useful if you have a power failure or computer failure.	Aim at the phaser and pull the trigger to change the color of the vest. Keep pulling the trigger until the vest is the color you want.
<b>Playing Game Mode</b>	Aim at any sensor, and the player will get a 40 second penalty. If you want to terminate the player, aim the terminator at their PHASER sensors during the 40-second penalty and pull the trigger without your hand on the sensor.	This causes a vest to be “Stunned”. It is a warning shot that causes the player to be out for the “Stun Time”. (Set by the computer).

### 7 EASY STEPS

## 7 EASY STEPS TO PLAYING A GAME

To play a game with the LaserBlast System following these steps:

1. Plug a battery into each vest and place it into the pouch.
2. Change the color of any vests, if you like, using the terminator.
3. Provide instructions to the players, and push the “START” button on the scanner.
4. Monitor the game play for rules violations.
5. When the game is over, assist players with “Scanning In”.
6. When everyone has scanned in, press the “FINISH” button on the computer screen.
7. The score sheets will print automatically (if enabled), or click on “PRINT ALL SCORES” if automatic printing is not enabled.

That’s all you have to do to play games with the LaserBlast System.

## The Software Bells and Whistles

This section of the manual describes the software operation in detail. The LaserBlast system allows a lot of flexibility, but most of our customers rarely change the settings, once they are set the way they want them.

### MAIN SCREEN

**Laser Blast B275 - Enchanted Castle**

<b>Print All Scores</b> <b>Select Paks For Printing</b> <b>Score Sheet Setup</b> <b>Game Setup</b> <b>Owner Reports</b> <b>Score Sheet Message</b> <b>2nd Monitor</b> <b>Sound Setup</b> <b>Maze Setup</b>	<input type="checkbox"/> Hitman	0	<input type="checkbox"/> Excalibr	0	<input type="checkbox"/> Quake	0
	<input checked="" type="checkbox"/> Dracula	-140	<input type="checkbox"/> WildStar	0	<input type="checkbox"/> KingKong	0
	<input checked="" type="checkbox"/> Assassin	-140	<input type="checkbox"/> Hammer	0	<input type="checkbox"/> Avenger	0
	<input checked="" type="checkbox"/> Blaster	-140	<input type="checkbox"/> Thor	0	<input type="checkbox"/> Stealth	0
	<input checked="" type="checkbox"/> Odd Job	-220	<input type="checkbox"/> Blitz	0	<input type="checkbox"/> Panther	0
	<input checked="" type="checkbox"/> Vader	1100	<input type="checkbox"/> The Rock	0	<input type="checkbox"/> Enforcer	0
	<input checked="" type="checkbox"/> The Dorg	880	<input checked="" type="checkbox"/> Omega	880	<input type="checkbox"/> Scorpion	0
	<input checked="" type="checkbox"/> Eraser	-200	<input checked="" type="checkbox"/> Fusion	-240	<input type="checkbox"/> TomCat	0
	<input checked="" type="checkbox"/> Commando	700	<input checked="" type="checkbox"/> Sloth	-300	<input type="checkbox"/> Ghost	0
	<input checked="" type="checkbox"/> Cow Tipper	-140	<input checked="" type="checkbox"/> Jester	700	<input type="checkbox"/> Cobra	0
<input checked="" type="checkbox"/> Ranger	2680	<input type="checkbox"/> SuprFang	0	<input type="checkbox"/> Patriot	0	
<input type="checkbox"/> Sniper	0	<input type="checkbox"/> BlakWolf	0	<input type="checkbox"/> Viper	0	
<input type="checkbox"/> Bubbles	0	<input type="checkbox"/> Twinkie	0	<input type="checkbox"/> Stunner	0	
<input type="checkbox"/> Morpheus	0	<input type="checkbox"/> Hawk	0	<input type="checkbox"/> Humvee	0	
<input type="checkbox"/> Thunder	0	<input type="checkbox"/> Trinity	0	<input type="checkbox"/> Robocop	0	
<input type="checkbox"/> Slythering	0	<input type="checkbox"/> Monster	0	<input type="checkbox"/> Xena	0	
<b>Total 940</b>		<b>Total 3380</b>		<b>Total 1100</b>		<b>Start</b> <b>Finish</b>
<b>Scores for Game Ended: 4/22/2003 8:42:35 PM</b>						
<b>Exit</b>	<b>Next Game</b> Team Game		<b>Next Game Time</b> + 10 -		<b>Next CD Track</b> + 1 -	
	<b>Game:</b> Team Game		<b>Paks Reporting:</b> 14		<b>Game Time Remaining:</b> 00:00	

Most of the functions you need are visible and can be accessed from the main screen.

This button will send the signal to the Scanner to stop scanning, and begin tabulating the scores of any vests whose data was received. Upon calculating the scores of any vests, it will display the scores on the Main Screen and the Optional 2<sup>nd</sup> Monitor.

# ABORT BUTTON

This is the #1 problem new LaserBlast users have, because the vests that were already in “Waiting for Game Mode” when a start button is pressed will start a new game, but vests that were in “Playing Game Mode” or “Scanning Mode” will not start a new game.

This button will send the signal to start the game with the configured settings of the control program, as though the start button on the Scanner had been pressed. When pressed during a game, it will re-send the remaining game time to any vest within the Scanner range, to facilitate adding players to the game late.

It will also change the “Finish Game” button to the “Abort Game” Button.

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## CURRENT GAME INFORMATION

This section of the screen shows information for the most recently completed game. Each vest name is displayed, and a check mark is placed next to vests that scanned in.

The vest name turns the color of the vest during that game. The vest with the highest score turns a paler color to make it easier for the referee to spot the high score player for each team. This is typically yelled at the crowd as the referee hands out the score sheets.

If a member played, then their member name is displayed.

If you do not want a particular vest included in the score calculations, you can remove the check mark next to their name before the "FINISH" button is pressed. As far as the scoring is concerned, it will be as if that player did not play. This is useful if you have experienced players that want to play and don't care about their score and novices that are playing at the same time and don't want to be embarrassed about their score.

**Laser Blast 1275 - Enchanted Castle**

<input type="checkbox"/> Hitman	0	<input type="checkbox"/> Excalibr	0	<input type="checkbox"/> Quake	0
<input checked="" type="checkbox"/> Dracula	-140	<input type="checkbox"/> WildStar	0	<input type="checkbox"/> KingKong	0
<input checked="" type="checkbox"/> Assassin	-140	<input type="checkbox"/> Hammer	0	<input type="checkbox"/> Avenger	0
<input checked="" type="checkbox"/> Blaster	-140	<input type="checkbox"/> Thor	0	<input type="checkbox"/> Stealth	0
<input checked="" type="checkbox"/> Odd Job	-220	<input type="checkbox"/> Blitz	0	<input type="checkbox"/> Panther	0
<input checked="" type="checkbox"/> Vader	1100	<input type="checkbox"/> The Rock	0	<input type="checkbox"/> Enforcer	0
<input checked="" type="checkbox"/> The Borg	880	<input checked="" type="checkbox"/> Omega	880	<input type="checkbox"/> Scorpion	0
<input checked="" type="checkbox"/> Eraser	-200	<input checked="" type="checkbox"/> Fusion	-240	<input type="checkbox"/> TomCat	0
<input checked="" type="checkbox"/> Commando	700	<input checked="" type="checkbox"/> Sloth	-300	<input type="checkbox"/> Ghost	0
<input checked="" type="checkbox"/> Cow Tipper	-140	<input checked="" type="checkbox"/> Jester	700	<input type="checkbox"/> Cobra	0
<input checked="" type="checkbox"/> Ranger	2680	<input type="checkbox"/> SuprFang	0	<input type="checkbox"/> Patriot	0
<input type="checkbox"/> Sniper	0	<input type="checkbox"/> BlakWolf	0	<input type="checkbox"/> Viper	0
<input type="checkbox"/> Bubbles	0	<input type="checkbox"/> Twinkie	0	<input type="checkbox"/> Stunner	0
<input type="checkbox"/> Morpheus	0	<input type="checkbox"/> Hawk	0	<input type="checkbox"/> Humvee	0
<input type="checkbox"/> Thunder	0	<input type="checkbox"/> Trinity	0	<input type="checkbox"/> Robocop	0
<input type="checkbox"/> Slythering	0	<input type="checkbox"/> Monster	0	<input type="checkbox"/> Xena	0

**Total 940**      **Total 3380**      **Total 1100**

Scores for Game Ended: 4/22/2003 8:42:35 PM

Next Game: Team Game      Next Game Time: + 10      Next CD Track: + 1

Game: Team Game      Paks Reporting: 14      Game Time Remaining: 00:00

### GAME NAME

This section displays the name of the game format selected for the game that most recently completed. The line above it indicates the selection for the next game that will be played.

### PAKS REPORTING

How many vests have scanned in at the end of the most recent game.

### TIME REMAINING

How much time is remaining in the current game. If the computer is rebooted while a game is playing, the computer keeps track of the game time, even while off.

## Print All Scores

This button is enabled after all vests are scanned-in and the “FINISH” button is pushed.

If the “AutoPrint” feature is enabled in the Game Setup screen, the scores will automatically be printed when you push the “FINISH” button.

## Select Paks for Printing

This button will reveal another row of checkboxes down the left side of each team’s VestList, allowing for only certain scores to be reprinted, should a person lose their first scorecard, or need another for framing or other purposes.

The screenshot shows the game interface with a sidebar on the left containing buttons: Print All Scores, Select Paks For Printing, Score Sheet Setup, Game Setup, Owner Reports, Score Sheet Message, 2nd Monitor, Sound Setup, Maze Setup, and Exit. The main area displays three vest lists for teams: Blast, B275 - Enchan, and another team. Each vest list has checkboxes and scores. The Blast team has scores: Hitman (0), Dracula (-140), Assassin (-140), Blaster (-140), Odd Job (-220), Vader (1100), The Borg (880), Eraser (-200), Commando (700), Cow Tipper (-140), Ranger (2680), Sniper (0), Bubbles (0), Morpheus (0), Thunder (0), and Slythering (0). The B275 - Enchan team has scores: Excalibur (0), WildStar (0), Hammer (0), Thor (0), Blitz (0), The Rock (0), Omega (880), Fusion (-240), Sloth (-300), Jester (700), SuprFang (0), BlakWolf (0), Twinkie (0), Hawk (0), Trinity (0), and Monster (0). The third team has scores: Quake (0), KingKong (0), Avenger (0), Stealth (0), Panther (0), Enforcer (0), Scorpion (0), TomCat (0), Ghost (0), Cobra (0), Patriot (0), Viper (0), Stunner (0), Humvee (0), Robocop (0), and Xena (0). Below the vest lists are three total score boxes: Total 940, Total 3380, and Total 1100. A message box says 'Scores for Game Ended: 4/22/2003 8:42:35 PM'. At the bottom, there are fields for 'Next Game' (Team Game), 'Next Game Time' (+ 10), 'Next CD Track' (+ 1), 'Game: Team Game', 'Paks Reporting: 14', and 'Game Time Remaining: 00:00'. Arrows point from the 'Print All Scores' and 'Select Paks For Printing' buttons to their respective descriptions, and from the 'Next Game Time' and 'Next CD Track' fields to their respective descriptions.

Team	Vest	Score
Blast	<input type="checkbox"/> Hitman	0
	<input checked="" type="checkbox"/> Dracula	-140
	<input checked="" type="checkbox"/> Assassin	-140
	<input checked="" type="checkbox"/> Blaster	-140
	<input checked="" type="checkbox"/> Odd Job	-220
	<input checked="" type="checkbox"/> Vader	1100
	<input checked="" type="checkbox"/> The Borg	880
	<input checked="" type="checkbox"/> Eraser	-200
	<input checked="" type="checkbox"/> Commando	700
	<input checked="" type="checkbox"/> Cow Tipper	-140
	<input checked="" type="checkbox"/> Ranger	2680
	<input type="checkbox"/> Sniper	0
	<input type="checkbox"/> Bubbles	0
	<input type="checkbox"/> Morpheus	0
	<input type="checkbox"/> Thunder	0
	<input type="checkbox"/> Slythering	0
B275 - Enchan	<input type="checkbox"/> Excalibur	0
	<input type="checkbox"/> WildStar	0
	<input type="checkbox"/> Hammer	0
	<input type="checkbox"/> Thor	0
	<input type="checkbox"/> Blitz	0
	<input type="checkbox"/> The Rock	0
	<input checked="" type="checkbox"/> Omega	880
	<input checked="" type="checkbox"/> Fusion	-240
	<input checked="" type="checkbox"/> Sloth	-300
	<input checked="" type="checkbox"/> Jester	700
	<input type="checkbox"/> SuprFang	0
	<input type="checkbox"/> BlakWolf	0
	<input type="checkbox"/> Twinkie	0
	<input type="checkbox"/> Hawk	0
	<input type="checkbox"/> Trinity	0
	<input type="checkbox"/> Monster	0
	<input type="checkbox"/> Quake	0
	<input type="checkbox"/> KingKong	0
	<input type="checkbox"/> Avenger	0
	<input type="checkbox"/> Stealth	0
	<input type="checkbox"/> Panther	0
	<input type="checkbox"/> Enforcer	0
	<input type="checkbox"/> Scorpion	0
	<input type="checkbox"/> TomCat	0
	<input type="checkbox"/> Ghost	0
	<input type="checkbox"/> Cobra	0
	<input type="checkbox"/> Patriot	0
	<input type="checkbox"/> Viper	0
	<input type="checkbox"/> Stunner	0
	<input type="checkbox"/> Humvee	0
	<input type="checkbox"/> Robocop	0
	<input type="checkbox"/> Xena	0

Total 940      Total 3380      Total 1100

Scores for Game Ended: 4/22/2003 8:42:35 PM

Next Game: Team Game      Next Game Time: + 10      Next CD Track: + 1

Game: Team Game      Paks Reporting: 14      Game Time Remaining: 00:00

## Next Game Time

This allows you to override the normal game time for the next game only. After a game is started, this Next Game Time will revert to the time set for that game in the Game Setup screen.

## Next CD Track

If you are using the CD player to pump music into the maze, you can select which Track to play.

## GAME SETUP SCREEN

The Game Setup Screen controls all of the different scoring and game play options. It also allows you to adjust the base hitting difficulty.

### Game Name

The Game Name is simply a name that you assign to a particular combination of settings. You can create as many game names as you like using the Save, New, and Delete buttons.

### Game Options

These options control the flavor of the game. Players are given capabilities and limitations. The details are described on the next page.

The screenshot shows the 'Game Setup' window with the following sections and annotations:

- Game Name:** A list of game names including Team Game, SOLO Game, Eliminator, Solo Speed, Team Speed, Rover, Sniper, Domination, and Rapid Fire Team.
  - Annotation: 'Delete the selected game.' points to the 'Delete' button.
  - Annotation: 'Save the settings using a new name.' points to the 'New' button.
  - Annotation: 'Save the settings using the selected Game Name.' points to the 'Save' button.
  - Annotation: 'Use the displayed settings for the next game (settings are not saved to a Game Name).' points to the 'Use This Game' button.
- Game Options:** A section with various sliders and checkboxes for game parameters.
  - Parameters include: Game Time (min), Stun Time (sec), Deac Time (sec), Shot Delay (sec), Bases Allowed, Photons, Mega Blasters, Ammunition, Shields, Stuns/Deac, Lives Allowed, Anti Stalker, Stealth Mode, Rapid Fire, Change Colors, Elimination, and Pushable Heat Senses.
  - Annotation: 'Exit this screen without saving the settings.' points to the 'Cancel' button.
- Game Play:** A section with radio buttons for Team Play, Individual Play, Normal Game, Rover Game, and Domination Game.
- Game Scoring:** A table showing points for different locations and bonuses.
 

Location	Points	Bonus	Point
Chest	100	Friendly Fire Penalty	0.2
Shoulder	50	Rover	10
Back	100		
Phaser	50	Base	1500
Hit Penalty	0%		
- Game Controls:** A section with checkboxes for Auto Score Print and Active Remote Finish Button.
- Game Password:** A section with a password field and a 'PW' label.
  - Annotation: 'Enter the password if this screen has a password set up.' points to the password field.

The Game Options portion of this screen allows you to adjust the following:

- ❑ **Game Time.** This is the length of the game (in minutes). You can override the game time on the main screen for 1 game. This affects the game time for the next game that starts. You cannot change the game time once you have started the vests, unless you terminate the game using the terminator, or unplug the batteries on all vests.
- ❑ **Stun Time.** This is the number of seconds that the vest will be unable to fire when a stun has occurred. A stun happens when someone is tagged in the shoulder or the phaser. Recommended: 1 second for younger players, 3 seconds for older players.
- ❑ **Deac Time.** This is the number of seconds that the vest will be unable to fire when you have been deactivated by a megablaster, or by being tagged by another player in the chest or the back. Recommended: 4 seconds for younger players, 8 seconds for older players.
- ❑ **Shot Delay.** This is the number of seconds between shots. Recommended: .13 seconds. You can create a really fun game if you set this to 3 seconds and call it a “Sniper” game.
- ❑ **Bases Allowed.** You can control the maximum number of times that each person can hit each base. Recommended: 2 or 3.
- ❑ **Photons.** The phaser is equipped with a wide angle IR emitter in the front that is capable of tagging anything within 20 feet and within a 45-degree angle. It is activated by tapping the option button on the chest. You can control how many photons are allowed per game using this setting. Recommended: 2 to 5.
- ❑ **Megablasters.** A megablaster is an optional maze device that acts sort of like a mine. A player tags it to arm it. 7 seconds later, it goes off, tagging anybody within 20 feet and 45 degrees. The player that armed the megablaster gets bonus points, plus the points for anybody the megablaster tags, as if the player tagged them himself. This setting controls the number times each player is allowed to tag each megablaster in the arena. Recommended: 2
- ❑ **Ammunition.** This setting controls how many shots can be fired in a game. Once this many shots have been taken, the player is out of ammo and cannot reload. Recommended: 10,000 (essentially unlimited)
- ❑ **Shields.** This setting controls how many shields you are allowed. A shield is activated by holding the chest option button until the shields are activated (about 3 seconds). When the shields are activated, the chest and back LED’s spin very fast and the player can fire, but can’t be tagged. Shields last 8 seconds. Recommended: 3 shields.



- ❑ Stuns/Deac. This setting controls how many stuns (phaser and shoulder hits) are needed to cause the vest to deactivate. For example, if this is set to 3, the stun time is set to 1 second, and the deactivation time to 10 seconds, then the first 2 times a person is tagged in the shoulder, they will be out for 1 second. The 3<sup>rd</sup> time they get tagged in the shoulder, they will be out for the full 10 seconds. If you look carefully at the chest LED's you can tell your relative health by how many LED's are chasing each other. If you only have 1 LED chasing itself, then the next hit to your phaser or shoulder will cause a full deactivation.
- ❑ Lives Allowed. If you are using an elimination game format (described below), this setting controls how many times you can be hit before the game is over for you. If "elimination" is not checked, then this setting does not matter.
- ❑ AntiStalker. This feature is used to prevent people from timing their shots so that you keep being hit immediately after your vest become active. If you check this box, the player has about 1/2 of a second advantage where they can fire, but they can't be hit. This keeps older kids from picking on younger kids. Recommended that you always keep this enabled.
- ❑ Rapid Fire. This feature allows you to fire continuously without having to release and pull the trigger every shot.
- ❑ Elimination. This feature enables "Limited Lives". If this box is checked, then the game will end when the game time has expired, or sooner, if the number of limited lives has been reached. Some arenas call this game "King of the Arena". If you set the limited lives to 10, and enable this feature, there is sometimes only 1 player left at the end of a 15-minute game.
- ❑ Stealth Mode. This feature allows the vests to operate with none of the LED's turned on. In a dark arena, this changes the game play a lot. The vest will always "LIGHT UP" when hit, even in stealth mode.
- ❑ Change Colors. If this feature is enabled, the vests will take on the color of whoever tags them. This feature works in conjunction with the two special game formats (Rover and Domination) described below.
- ❑ Enable Heat Sensor. If this feature is enabled, the player must hold the phaser with 2 hands, or it will not fire and will honk at them. It will also say "USE TWO HANDS" on the back of the LCD. This feature reduces the likelihood of injury by discouraging people from swinging their phaser. Recommended: Always leave this on.

The Game Type section of the screen allows you to select the basic scoring method. These are described below.

- ❑ Team Play vs. Individual Play. The only difference between these basic game types is whether or not your score is penalized for hitting other people (or bases) with the same color. Some players manage to get negative scores by hitting their own team's color. If you don't want negative scores, you can either always run Individual Play, or change the "Friendly Fire" setting to 0.
- ❑ Normal Game. This is the setting used when you are not playing a "Special Game", such as Rover or Domination.
- ❑ Rover Game. This special game format is played by starting all players with green vests, except one: The Blue Rover.

All of the green players are trying not to get tagged by the Blue Rover because they get "Rover" points for each second that their vest remains green. If the Blue Rover tags them, their vest will turn red and they will no longer be accumulating "Rover" points. Once they have been turned red by the Blue Rover, they can continue trying to get points by tagging all of the players in the arena as usual. They can also still tag the bases and megablasters.

- ❑ Domination Game. This special game format is played by starting the players equally divided into all 3 colors. You play this game with "Change Colors" enabled. The goal of the game is to convert all of the players in the arena to the color that you began the game with. This game can take some pretty strange tacks, because the team that you are on can change in one shot. It is a particularly good game for team building exercises.

The Scoring Section of the Game Setup Screen allows you to customize how many points each target is worth. It also controls whether points are awarded for accuracy, or whether points are deducted for hitting your own teammates in a team game.

- ❑ Chest, Shoulder, Back Phaser. This is the number of points you get for tagging opponents in each location.
- ❑ Hit Penalty. You can set up the scoring system so that you lose points for being hit. By selecting something other than 0%, you can control how many points you lose for being hit. For example, if the chest is set to 200 points, and the hit penalty is set to 10%, then you will lose 20 points for every time you are hit in the chest. In this example, the person who tagged you would get 200 points. This feature encourages defensive play.
- ❑ Friendly Fire Penalty. You can set up how big a penalty there is for tagging your own teammates or your own base. This field is a fraction. For example, if you set it to 0.2, and you tag someone on your own team, you will have 20% of the points for that target deducted from your score.

- ❑ Rover. This is the number of points per second awarded to people playing a Rover game for every second they can keep their vest from turning red.
- ❑ MegaBlaster. This is how many bonus points are awarded for tagging the megablaster.
- ❑ Bases. This is how many bonus points are awarded for tagging an opponent's base.
- ❑ Accuracy Threshold and Count %Acc Bonus. These two settings work together to determine how many extra points you get for good accuracy.

The Accuracy Threshold determines how good a player's accuracy has to be before they get any bonus points at all. If the player's accuracy is below the amount selected here, they get no accuracy bonus points.

If a player has accuracy higher than the Accuracy Threshold, then the player gets an accuracy bonus. This bonus is calculated as their accuracy times their score times the "Count %Acc Bonus" multiplier.

For example, if the Threshold is set to 3%, and the "Count %Acc Bonus" is set to 2, the player's score is 10,000 points, and the player's accuracy is 5%, then the accuracy bonus points that will be added to the 10,000 points is:

5% times 10,000 points times 2 = 1000 points.

The Base Options Section of the Game Setup Screen allows you to customize how difficult it is to hit the base.

- ❑ Hit Delay. It takes 4 shots to get credit for hitting the base. This setting determines how much time must elapse between each of these 4 shots. If you set it somewhere around 3 seconds, it makes it difficult to hit the opponents base, and easier to keep people from hitting your own base. We recommend that you always set it to at least 1 second.
- ❑ Relay Delay. This setting determines how long the base relay will be energized after the base has been hit (and thus, the amount of time before the base can be hit again). Typically 7 seconds is a good setting.
- ❑ Base Tag Required. If you select this feature, the base will not allow the same person to tag it twice in a row. If selected, someone else must tag the base before you can tag it again. This requires more teamwork and makes it more difficult to get the maximum number of bases.

The Printer Options Section of the Game Setup Screen allows you to control the way the software buttons work on the main screen.

- ❑ AutoScorePrint. If this feature is checked, the score sheets will be printed automatically when the “Finish” button is pressed on the main screen. If this feature is not checked, then you have to manually select “Print All Paks” after each game.
- ❑ Activate Remote Finish. This feature allows the start button on the scanner to do the same thing as clicking on the “Finish” button on the main screen after scanning has finished. Some arena operators have a long distance between the scanner and the computer. Keep in mind that activating this feature will allow careless referees to tell the computer to finish scanning before they intended to and can cause delays while you rescan vests.

## SCORE SHEET SETUP SCREEN

The Score Sheet Setup screen is used to select options for printing. The Windows operating system also has a printer settings screen that is used for printer settings, such as ink level, draft quality, bin selection, color greyscaling, and color calibration. The Windows printer settings vary from printer to printer. Refer to your printer manual, or call LaserBlast for assistance optimizing your Windows printer specific settings.

The Horizontal and Vertical Start settings are used to align the text with preprinted score sheets. The Separation slide bar adjusts how much space is between the top and bottom score sheet when printing 2 score sheets per 8½ x 11.

The screenshot shows the "Score Sheet Setup" dialog box. It has a title bar with a close button. The main area is divided into several sections. On the left, there's a "VERTICAL" section with a scroll bar and a "HORIZONTAL START" section with a numeric input field set to 167. Below these is a "Player #1" section showing test data: Score: 999, Shots: 99, Accuracy: 10%, Rank: 1/10. To the right of this is a "Print Special Message" checkbox which is checked. Further right is a "Printers" section with a "Printer Name" field and a "Default Printer" checkbox. At the bottom, there are "B&W Scores" and "Full Sheets" / "Half Sheets" radio buttons. The "Full Sheets" option is selected. There are also "Save Values & Print Form", "Save Values & Print Test", "Save & Exit", and "Cancel" buttons. A "PW" field is at the bottom right.

Prints a blank form and saves any changes you made to the settings.

Check this box if you are using a black and white printer so that the printer doesn't try to "Greyscale" the colors.

Fills in test data and prints a score sheet so you can verify the alignment. It also saves any changes that you made to the settings.

Select whether you prefer perforated 8½ x 11 full sheets with 2 score sheets per page, or half sheets.

Most people prefer full sheets.

Check this box if you want helpful game hints printed on the score sheets. Checking this box on some printers causes problems because some printers can't print close enough to the bottom of the page. If you have blank sheets printing after each score sheet, uncheck this box.

Another solution, would be to adjust the vertical position of the score sheet up so that the printer does not try to print lower than it can.

**Score Sheet Setup**

**HORIZONTAL START** 167

**VERTICAL** 366

**Print Special Message** ☒

**Printers**

Printer Name
<input checked="" type="checkbox"/> Default Printer

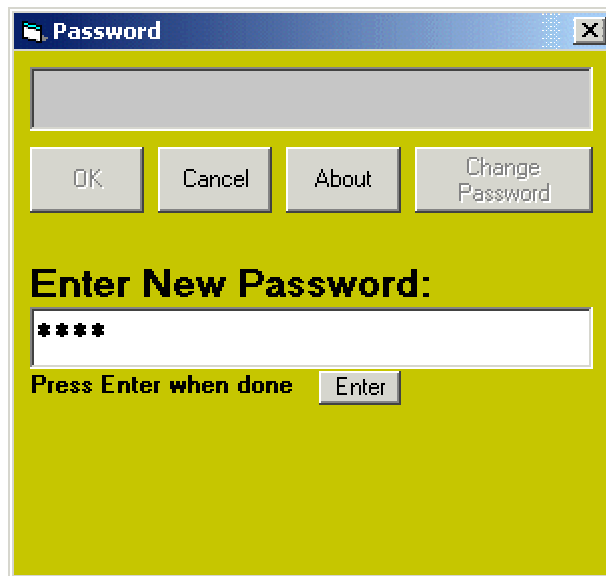
**Save Values & Print Form** **Save Values & Print Test** ☐ **B&W Scores** ☒ **Full Sheets** ☐ **Half Sheets** **Save & Exit** **Cancel** **PW**

The owner can set a password to prevent operators from changing this screen. If a password is set, you must enter it here before you can change any settings on this screen.

The LaserBlast system supports multiple printers. If your system has more than one printer connected, they will all be listed under the column "Printer Name". You can adjust the relative print speed between the printers so that all of the printers will be assigned the number of score sheets that allows them to finish printing at the same time.

## OWNER REPORTS SCREEN

The Owner Reports Screen is protected by a password to prevent unauthorized tampering. The system is originally shipped with no password, so you should click on “Change Password” when first setting up the system.



The screenshot shows a Windows-style dialog box titled "Password". It has a yellow background. At the top, there is a grey rectangular input field. Below it, there are four buttons: "OK", "Cancel", "About", and "Change Password". The "Change Password" button is highlighted. Below the buttons, the text "Enter New Password:" is displayed in bold. Underneath this text is another grey rectangular input field containing four asterisks "\*\*\*\*". Below the input field, the text "Press Enter when done" is displayed, followed by an "Enter" button.

You will be asked to reconfirm the password. If you forget the password you entered, LaserBlast can give you a new one.

Once a password has been entered, you are taken to the screen shown on the next page. As an owner, you can assign passwords, or disable passwords to various other screens that control the LaserBlast system. Many years of arena experience have shown that passwords prevent system problems. We recommend you restrict immature employees or customers from all of the screens listed.

Each of the buttons on the right side of the Owner Reports screen will be explained separately.

**Owner Reports**

Score Sheet Setup Authorization  
☒ Remove Score Sheet Setup Access  
Set Password

Game Setup Authorization  
☒ Remove Game Setup Access  
Set Password

Second Monitor Authorization  
☒ Remove 2nd Monitor Setup Access  
Max Game Scores to Save 25  
Set Password

Sound Setup Authorization  
☒ Remove Sound Setup Access  
Set Password

Maze Setup Authorization  
☒ Remove Maze Setup Access  
Set Password

Games Report  
Totalizer Report  
Membership List  
Member Scores  
Delete Members  
Flash Phaser Sounds  
Change Phaser Default Names  
Exit

Your system can redisplay or reprint scores from previous games. This setting determines how many games are stored on the disk drive before old games are automatically deleted.

Exit Owner Reports

## GAMES REPORT SCREEN

This screen displays game play information from the previous 3 weeks. The data can be printed. Every game that is played is recorded in a file called "C:\LaserBlast\LaserBlast.CSV". This file is compatible with XL, Word, or any other ASCII compatible spreadsheet or word processor. If you would like to view game data from more than 3 weeks ago, you can load this file into any other spreadsheet or word processor program and view it or analyze it, as you like.

**Owner Report - Game Records**

Number of Players			
Tonight	This Week	This Month	This Year
0	42	153	222

Number of Games Played			
Tonight	This Week	This Month	This Year
0	3	37	65

Listing of games since Saturday 4/5/2003

Games on Saturday 4/5/2003  
2:34:58p for 0:01:33 Players: 1  
2:40:38p for 0:20:30 Players: 2  
Total Games: 2 Players: 3

Games on Tuesday 4/15/2003  
3:53:41p for 0:05:17 Players: 2  
4:00:34p for 0:11:29 Players: 2  
Total Games: 2 Players: 4

Games on Wednesday 4/16/2003  
1:17:53p for 0:03:28 Players: 15  
1:35:54p for 0:02:10 Players: 1  
1:38:08p for 0:01:37 Players: 2  
1:39:52p for 0:01:22 Players: 2  
1:49:08p for 0:01:39 Players: 1  
1:50:58p for 0:05:26 Players: 1  
1:56:25p for 0:02:51 Players: 4  
2:01:00p for 0:05:12 Players: 2  
2:17:40p for 0:01:31 Players: 1  
2:21:06p for 0:35:07 Players: 7  
2:56:26p for 0:13:28 Players: 1  
3:13:56p for 0:01:58 Players: 1  
3:16:55p for 0:13:18 Players: 11  
3:30:57p for 0:03:21 Players: 2  
6:03:04p for 0:03:52 Players: 3  
7:12:14p for 0:04:01 Players: 1

Print

Done

Report Complete 4/26/2003 5:35:57 PM

The number of times each vest has played in a game is also recorded in each vest. This Totalizer data cannot be tampered with in any way, and is therefore potentially useful to an absentee owner worried about employee theft.

## THE TOTALIZER REPORT

The Totalizer Report displays the number of times each vest has played a game since it was manufactured. This data is read in from the vest at the end of each game, and therefore cannot be tampered with. This is why the data only shows up for vests that have been scanned in since the LaserBlast control program was started. The totalizer in each vest only counts a game as being played if at least 30 shots have been taken.



This allows referees to take a few shots to test a vest, or demonstrate the vest without counting it as a game.

**Totalizer Report**

**Pak Totalizer Report**

<input type="checkbox"/> Hitman		<input type="checkbox"/> Excalibr		<input type="checkbox"/> Quake	
<input type="checkbox"/> Dracula		<input type="checkbox"/> WildStar		<input type="checkbox"/> KingKong	
<input type="checkbox"/> Assassin		<input type="checkbox"/> Hammer		<input type="checkbox"/> Avenger	
<input type="checkbox"/> Blaster		<input type="checkbox"/> Thor		<input type="checkbox"/> Stealth	
<input type="checkbox"/> Odd Job		<input type="checkbox"/> Blitz		<input type="checkbox"/> Panther	
<input type="checkbox"/> Vader		<input type="checkbox"/> The Rock		<input type="checkbox"/> Enforcer	
<input type="checkbox"/> The Borg		<input type="checkbox"/> Omega		<input type="checkbox"/> Scorpion	
<input type="checkbox"/> Eraser		<input type="checkbox"/> Fusion		<input type="checkbox"/> TomCat	
<input type="checkbox"/> Commando		<input type="checkbox"/> Sloth		<input type="checkbox"/> Ghost	
<input type="checkbox"/> Cow Tipper		<input type="checkbox"/> Jester		<input type="checkbox"/> Cobra	
<input type="checkbox"/> Ranger		<input type="checkbox"/> SuprFang		<input type="checkbox"/> Patriot	
<input type="checkbox"/> Sniper		<input type="checkbox"/> BlakWolf		<input type="checkbox"/> Viper	
<input type="checkbox"/> Bubbles		<input type="checkbox"/> Twinkie		<input type="checkbox"/> Stunner	
<input type="checkbox"/> Morpheus		<input type="checkbox"/> Hawk		<input type="checkbox"/> Humvee	
<input type="checkbox"/> Thunder		<input type="checkbox"/> Trinity		<input type="checkbox"/> Robocop	
<input type="checkbox"/> Slythering		<input type="checkbox"/> Monster		<input type="checkbox"/> Xena	

**Print**

**Done**

4/26/2003 5:35:51 PM

## MEMBERSHIP LIST

This report creates a file called “C:\LaserBlast\membership.csv” that can be used by any other spreadsheet, word processor, or label generator program you like to do whatever you like with your membership data.

**Member Listing**

List of

☒ All Members

☐ Expired Members

04/26/2003

**OK** **Cancel**

## MEMBER SCORES

This button creates a report on the printer that lists all the members, their statistics, their scores, and their rankings. We suggest posting these on the lobby wall to attract more players and create repeat game play. You can select which month you want to print the data for. Member data is stored for one year only.



## DELETE MEMBERS

This button brings up a screen that allows you select a particular member and delete their record. Caution must be used in deleting member data because once it is deleted, it cannot be recovered without loading the most recent membership backup file which may not have all the data for recent member activities.

## FLASH PHASER SOUNDS

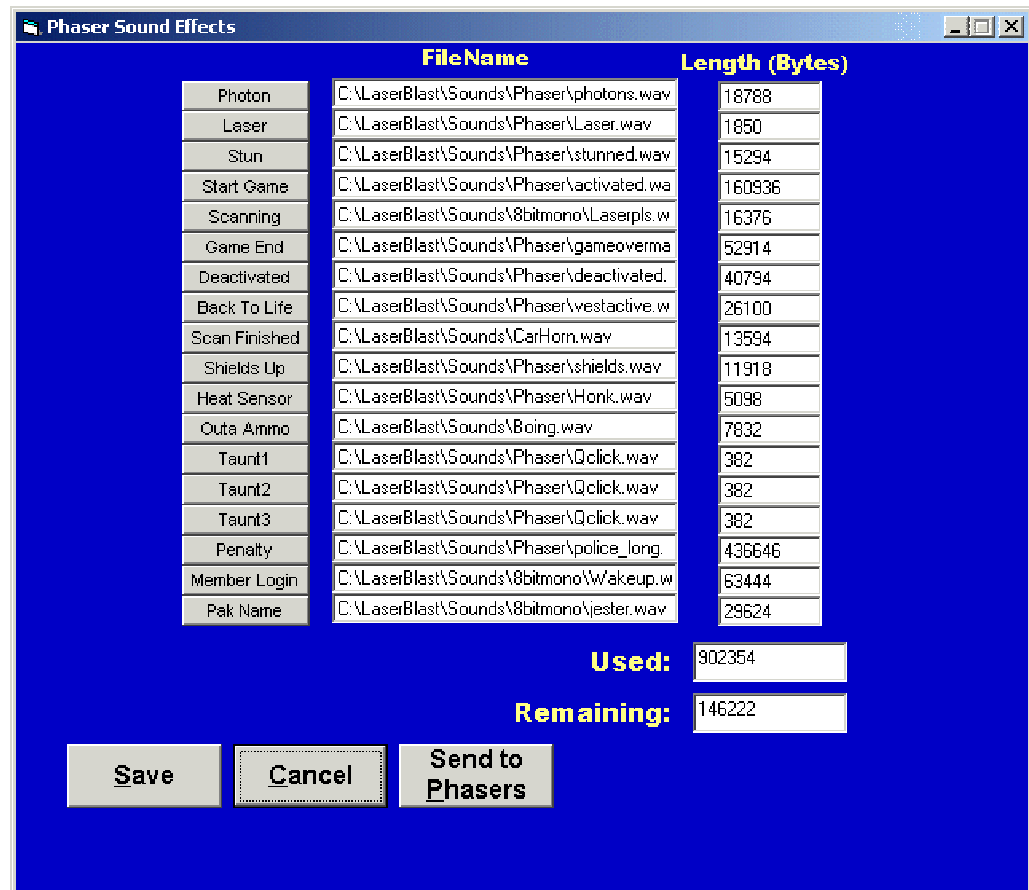
The LaserBlast phasers have many sound effects programmed into them. If you bought the optional programmer, you can record your own sound effects, and install them into the phasers. This takes about 15 minutes per phaser, and requires removing the cover of each phaser, so it should only be done by someone who has been trained on how to remove the cover of a LaserBlast phaser without pinching wires or otherwise damaging the phaser.

To program the phaser sounds you select the type of sound you want to change, and browse to your new choice. When you select a new sound file, it will play for you.

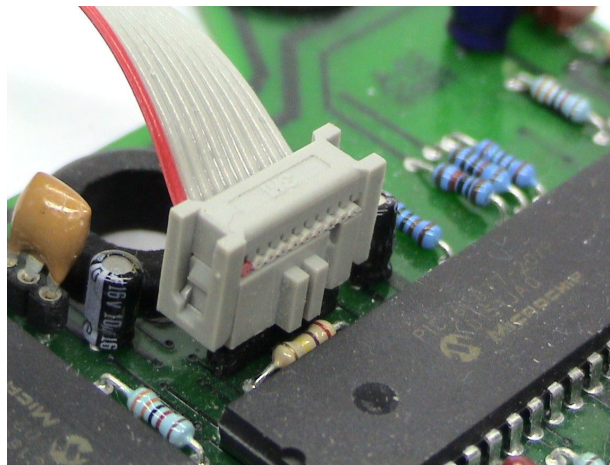
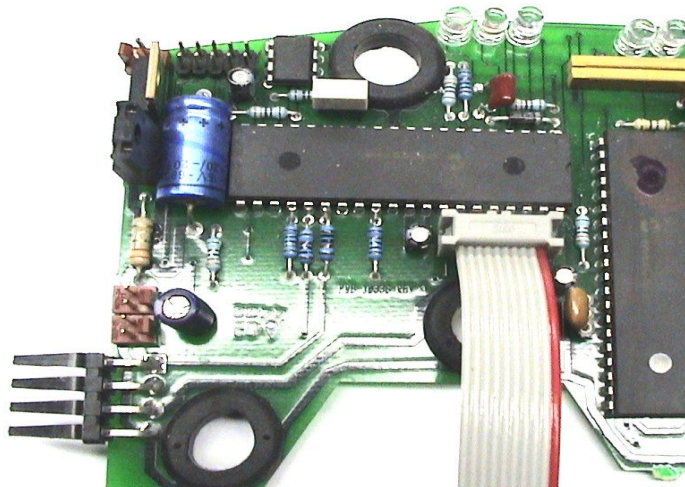
Only 8-bit mono sounds will work for the phaser sound effects. In addition, the phaser can only hold certain size files. The amount of memory remaining in the phaser is displayed for you. To change the sound effect to 8-bit mono, open the file SuperSonic (included with LaserBlast Software), or other external music or sound program. Follow the sound editor's directions on changing the format to 8-bit mono.

When you have all of the sounds for the phaser selected the way you want them, then click on the "SAVE" button. After saving your settings, click on the "Send To Phasers" button. The software prompts you to connect the scanner cable and programmer cable to the phaser at the appropriate time. Make sure that there is no

battery plugged into the vest and that the chest to phaser cable is unplugged before connecting the programmer cable to the phaser.



The following photos show how to connect the programming cable to the phaser. Make sure you put the red stripe of the cable as shown. Use the row of 5 pins on the connector closest to the far edge of the connector.

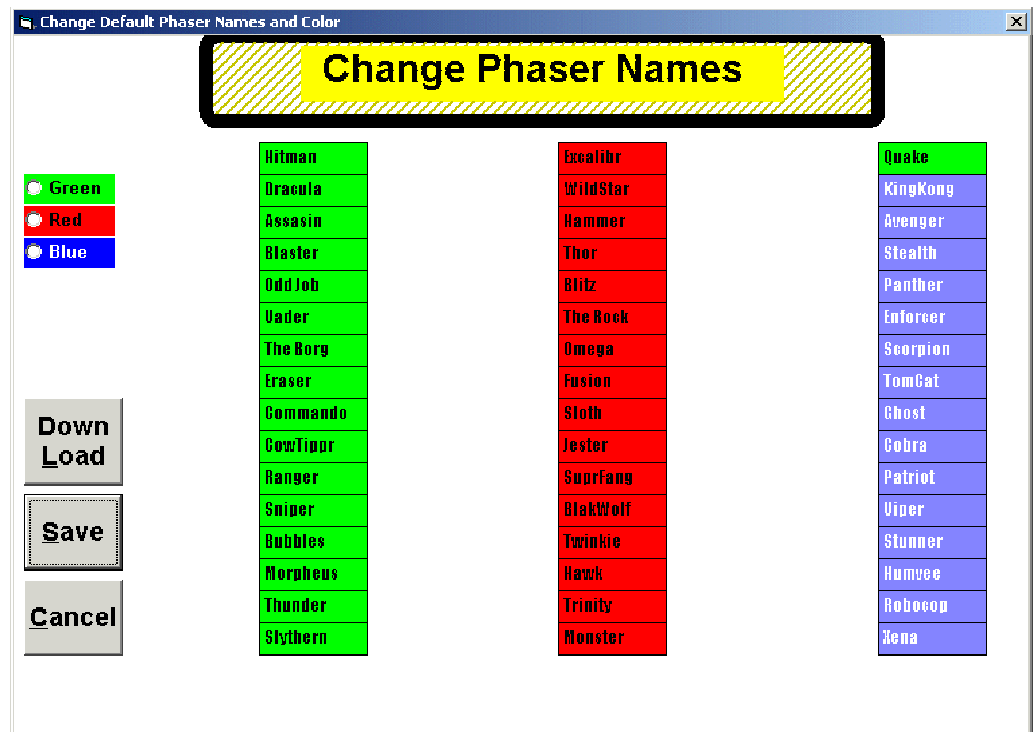


## CHANGE PHASER NAMES

You can change the names of the LaserBlast vests if you have the optional programmer. However, you cannot change the name of just one vest. You must change the names on all of the vests, because the names of all of the vests are stored in each of the phasers. You also have to remove all of the covers to the phasers and reinstall the covers without pinching wires. Since the names of the phasers will have changed, you have to reprogram all of the sound effects also, if you want the vest to say its own name at the end of the game. Allow at least 15 minutes per phaser for an experienced technician to change the name and reprogram the sound effects.

After pressing the “Change Phaser Names” button, the following screen is displayed. You can change the color of the vest so that it powers whatever color you would like. Click on the color you want on the left of the screen and click on the existing name of the phaser. Edit the name of the phaser.

When all of the phasers are the color you want, and the names have all been edited, click on the “Save” button. After saving your changes, now click on the “Download” button and follow the instructions on the screen telling you when to hook up the programmer cable to the phaser. Make sure that there is no battery plugged into the vest and that the chest to phaser cable is unplugged before connecting the programmer cable to the phaser.



## SCORE SHEET MESSAGE

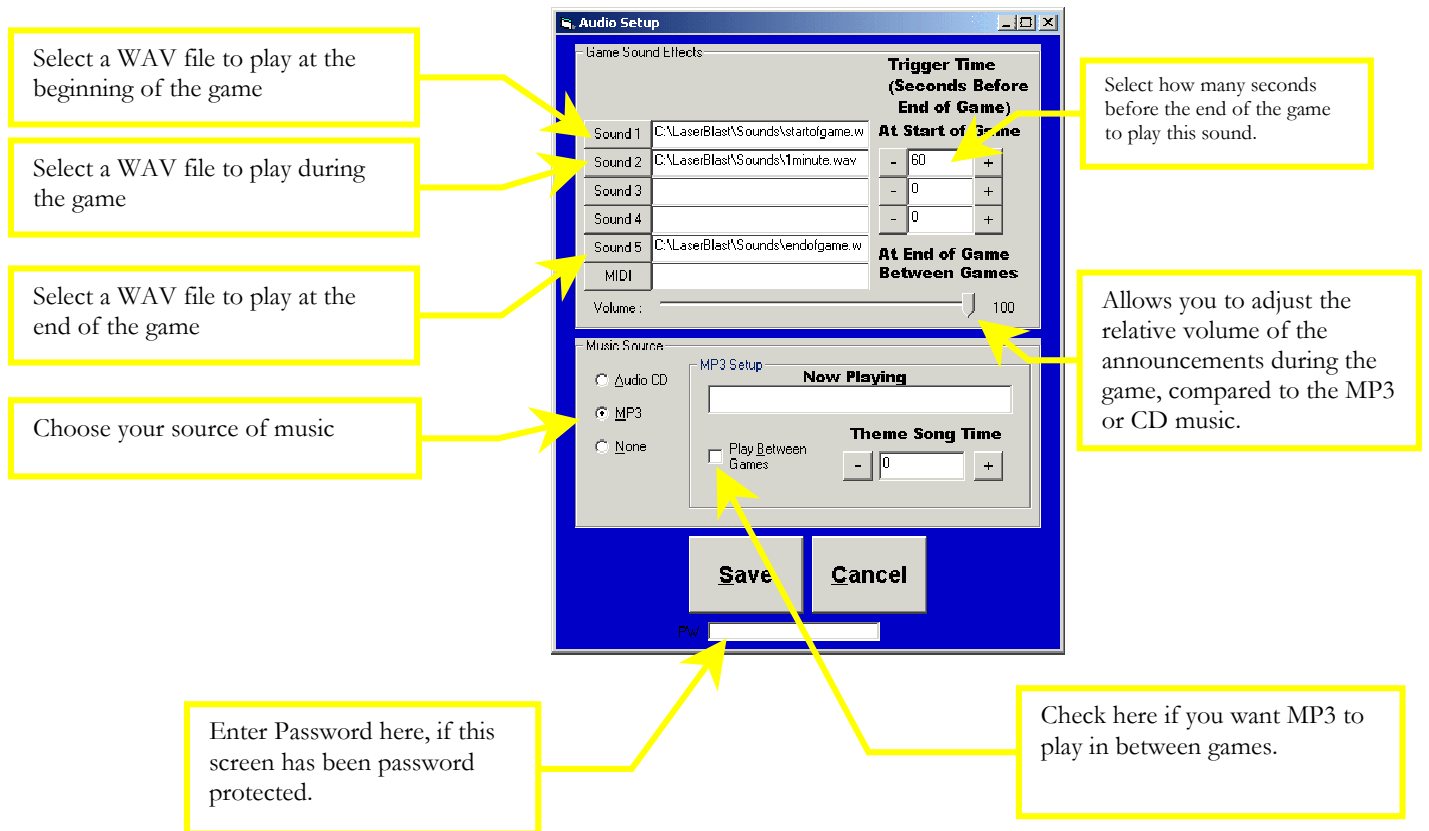
The LaserBlast system allows you to add a message to every score sheet. You can use this for a “Happy Birthday” message, or to announce specials, contests, or any other message.



## SOUND SETUP SCREEN

The LaserBlast system is capable of playing music from a CD or from MP3's (optional). It also can make pre-recorded announcements for you at the beginning of the game, during the game, and when the game ends. If you have the optional MP3 player software, it will allow you to designate a “theme” song that is played during the first seconds of every game. You can control how long this theme song plays before the regular randomly selected MP3 song is played.

The MP3's must be installed using the shareware program called Music Match (included on the installation CD). All of the MP3's must be installed in the directory called “C:\LaserBlast\MP3”. The software will randomly select a song from this directory. The theme song is selected randomly from any MP3's in the “C:\LaserBlast\MP3 startups” directory. Music Match is easy to use and has a built in help function. The only thing you have to do after using Music Match to convert an audio CD into an MP3, is move the MP3 to the correct directory for LaserBlast. You can do this using Windows Explorer.



## MAZE SETUP SCREEN

The maze setup screen is used to program the bases with sound effects, and test the scanner connection or the optional holster scanners.

	FileName	Length (Bytes)
Power Up	C:\LaserBlast\Sounds\8bitstereo\yeha[1].w	71718
First Hit	C:\LaserBlast\Sounds\8bitstereo\wpn0_lb.	22674
2nd Hit	C:\LaserBlast\Sounds\8bitstereo\wpn1_lb.	25314
3rd Hit	C:\LaserBlast\Sounds\8bitstereo\dont_push	29360
Explode	C:\LaserBlast\Sounds\8bitstereo\12Gauge_	41682
Hit Limit	C:\LaserBlast\Sounds\8bitstereo\denied[1].	27020
Taunt 1	C:\LaserBlast\Sounds\8bitstereo\bugs_bun	71816
Taunt 2	C:\LaserBlast\Sounds\8bitstereo\blowin_thi	27754
Taunt 3	C:\LaserBlast\Sounds\8bitstereo\Houston.	27882
Taunt 4	C:\LaserBlast\Sounds\8bitstereo\razz[1].wa	71228
Taunt 5	C:\LaserBlast\Sounds\8bitstereo\g-loser[1].	67284

**Used:** 483732  
**Remaining:** 40556

**Device Select**

- ☐ Green Base
- ☐ Red Base
- ☐ Blue Base
- ☐ Pod 1
- ☐ Pod 2
- ☐ Pod 3
- ☐ Pod 4
- ☐ MegaBlaster1
- ☐ MegaBlaster2
- ☐ MegaBlaster3
- ☐ MegaBlaster4
- ☐ Pod 5
- ☐ Pod 6
- ☐ Pod 7
- ☐ Pod 8
- ☐ Click All

Greyed-out devices did not respond to query

**Scanner Port**

- ☒ COM1
- ☐ COM2
- ☐ COM3
- ☐ COM4
- ☐ COM5
- ☐ COM6

**Buttons:** Save, Cancel, Clear & Re-Program Maze, Query Devices, Test Comm, Test Holsters

PW:  Comm:

If you want to change the taunts or sound effects in the bases, click on the type of sound effect you want to change, and browse to your desired file. The WAV file you pick must be an 8-bit stereo wav file. If you need to convert a sound, use the SuperSonic program provided, or any other sound-editing program you like. The bases have a limited amount of memory, so the screen displays the amount used and the amount remaining.

You can program each base with different sound affects, if you like. Once you have the sounds that you want selected, put a check mark next to the name of the base that you want to reprogram. Click on “Clear & Re-Program Maze”. This operation can take up to 30 minutes, and you must allow it to fully complete, otherwise your bases will have the sound effect chip in it erased, but not filled with new sounds yet.

The PW space is for a password, if enabled. It is strongly suggested that you activate a password for this screen. Most operators have a curious employee that clobbers the base sound effects at least once.



The “Query Devices” button will put out a message on the LaserBlast network asking any devices connected to respond. The device has to be plugged in and turned on in order for it to show up here.

The “TEST COMM” button can be used to verify the RS232 connection between the computer and the scanner. This test will transfer data continuously back and forth between the scanner and the computer and provide statistics. RS232 serial ports can become damaged during storms, or get plugged in backwards, or.. anyway, it is sometimes helpful to be able to verify a serial port.

The “Scanner Port” buttons allow you to pick a different RS232 serial port for the scanner connection. This can also be handy when setting up new computers, or troubleshooting damaged RS232 ports.

The “Test Holsters” button is only used for optional holster scanner systems. It sends out commands to the holsters that cause their beacons to alternate between red and green. This allows easy verification of the telephone data connections between each holster.

The LaserBlast system also makes an announcement over the sound system every time a base or megablaster is hit. The name of the file that is played for each device is shown in the following table.

DEVICE NAME	FILENAME
GREEN BASE	C:\LASERBLAST\SOUNDS\DEVICE0.WAV
RED BASE	C:\LASERBLAST\SOUNDS\DEVICE1.WAV
BLUE BASE	C:\LASERBLAST\SOUNDS\DEVICE2.WAV
MEGABLASTER1	C:\LASERBLAST\SOUNDS\DEVICE7.WAV
MEGABLASTER2	C:\LASERBLAST\SOUNDS\DEVICE8.WAV
MEGABLASTER3	C:\LASERBLAST\SOUNDS\DEVICE9.WAV
MEGABLASTER4	C:\LASERBLAST\SOUNDS\DEVICE10.WAV

The system is shipped with pre-recorded sounds, but if you would like to change the sounds for each device, you are free to do so. You may want to save the original file in a different directory, just in case you change your mind. To play a different sound, simply change your sounds name to the appropriate file name and put it in the “C:\LaserBlast\Sounds” directory.

## 2<sup>nd</sup> MONITOR SCREEN

The LaserBlast system has an optional 2<sup>nd</sup> audience monitor. This monitor can be used to display the game scores in a 2<sup>nd</sup> location. It also displays member statistics and provides a scrolling marquee for advertising messages.

This optional software feature also provides the ability to scroll back to previous game results and display the scores on the 2<sup>nd</sup> monitor.

The screenshot shows the '2nd Monitor Setup' window. It includes a 'Game Displayed' section with 'Prev Game', 'Next Game', and 'Current Game' buttons. The 'Display Options' section has checkboxes for 'Show Stats', 'Twice Only', 'Slow Player Display', and 'Operator A'. There is a 'Scrolling Sign' section with 'Sign', 'Chk Pos', and 'Force Pos' buttons. A password field 'Pw' is at the bottom right. Callout boxes provide detailed instructions for each of these features.

Scroll through the game data stored on the hard drive and select which game to display.

Check this box if you want the STATS screen displayed.

Check this box if you want the STATS screen to display twice only. If unchecked, the STATS screen will always be displayed.

Enter the Scrolling Sign menu area to set up the marquee.

Check this box if you want the 2<sup>nd</sup> monitor to display the players scores one at a time, starting from the worst to the best. Uncheck the box if you want all players displayed at the same time.

Click this button to verify that the current position of all the screens is in a valid Windows location.

Display the current game data on the 2<sup>nd</sup> monitor

Allows you to select the font used on the 2<sup>nd</sup> monitor display.

Check this box if you want the arena operator to have control over when the scores are displayed on the 2<sup>nd</sup> monitor. This is useful while taunting the audience about who they think won.

Enter Password here, if this screen has been password protected.

Click on this button if you can't find the screens that should be on the 2<sup>nd</sup> monitor. This button forces all of the 2<sup>nd</sup> monitor screens to be located in the center of the main monitor. Once located, they can be repositioned to the 2<sup>nd</sup> monitor.

The 2<sup>nd</sup> Monitor software consists of 4 screens that can be re-arranged and positioned however you like on the 2<sup>nd</sup> monitor. These screens are:

1. The Scores Screen
2. The Current Game Statistics Screen
3. The Player STATS Screen
4. The Marquee

Normally the scores screen and the Player STATS Screen are positioned at the top left of the 2<sup>nd</sup> monitor. The Current Game Statistics Screen is positioned below it, and The Marquee is positioned along the bottom of the 2<sup>nd</sup> monitor. Positioning the screens is accomplished by grabbing the corners of the screens with your mouse and dragging them into the desired position. These screen positions are saved whenever you exit the main program. The next time you run LaserBlast, the screens will appear in the same position.

Team Name and Team Score.

Scores			
<b>Green Team</b>	<b>940</b>	<b>Red Team</b>	<b>3,380</b>
#03 Omega	880	#01 Ranger	2,680
#04 The Borg	880	#05 Jester	700
#06 Commando	700		
#07 Assassin	-140		
#08 Dracula	140		
#09 Cow Tipper	-140		
#10 Blaster	-140		
#11 Eraser	-200		
#12 Odd Job	220		
#13 Fusion	-240		
#14 Sloth	-300		

Player's Score.

Player's Vest Name. Member names will be displayed here.

Player's Rank for that game.

The Current Game Statistics screen shown below allows people in the audience to see which player has hit the bases and megablasters. This screen is updated instantly while the current game is being played.

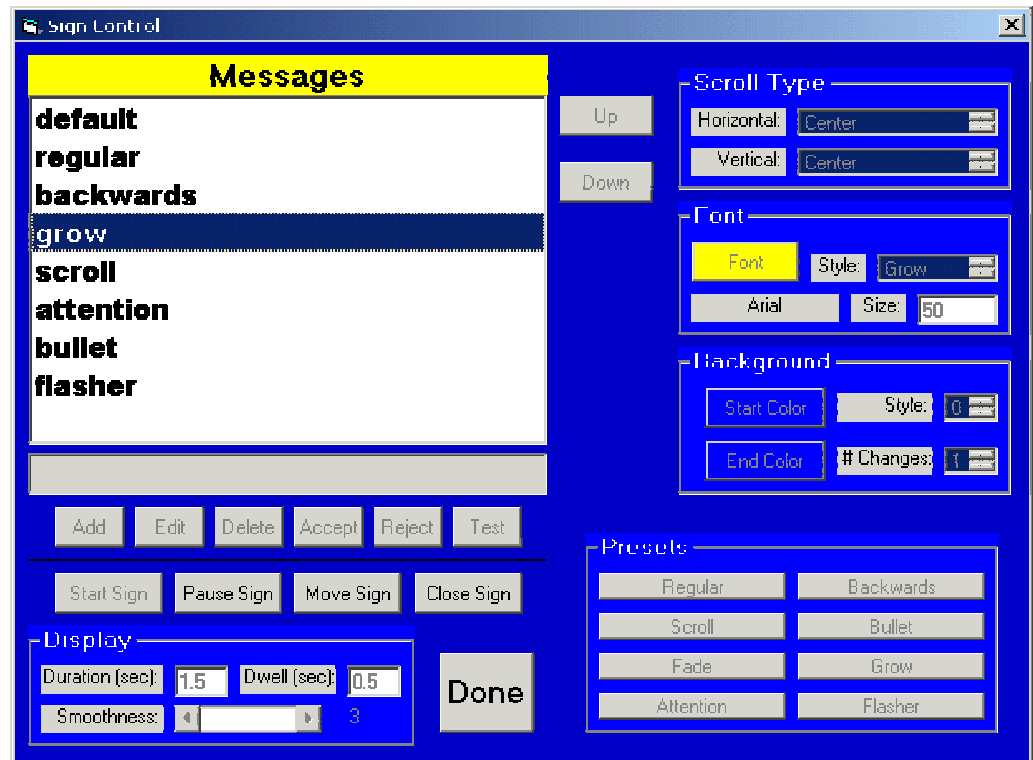


The Stats screen is displayed for each player that played during the last game. This encourages members who want to review their stats to play a game.

Stats			
Player Stats		Bases	
Player	The Borg	Bases Hit	
Score	880	Green	0
Shots Fired	120	Red	0
Accuracy	20.0%		
Rank	4 / 14		
Best of the Green team			
Member Stats			
Member	Not A Member		
Games	---	Score	---
Accuracy	---	Average	---
Member Rank			---

## THE SCROLLING SIGN SCREEN

The LaserBlast system allows you to control the scrolling sign text effects. It has 8 preset effects, but also allows you to edit and combine the special effects for each message. The sign will present whatever message you like in the marquee screen. You can control all of the characteristics of the message that you see in the screen below.



By clicking on the “Test” button, you can preview the effects you have chosen. When you click on “Done”, your messages are saved and will be displayed continuously on the Marquee Screen.

## MEMBERSHIP

The LaserBlast System has an optional membership hardware and software package. It allows the operator to sell a membership button (shown below). The system allows the members the following benefits:

- 1) The member gets to create his or her own name. All score sheets and monitor screens will have their name on it.
- 2) The computer keeps track of all of their statistics. The statistics can be printed on the printer to allow the member to see their rankings with other players.
- 3) The member gets 2 extra photons and 2 extra shields in each game. Some operators ask us to change the program in the phasers for more or less member benefits, so your equipment may have a variation in it.



The owner benefits from membership through initial Membership sales revenue and increased game play. To gather the member information, simply touch the member button to the member button reader and enter the information into the screen below:

If you want to sell lifetime memberships, we recommend you set the expired date to 1/1/2050. You can use any date prior to the year 3000.

**Birthday Button.** The LaserBlast System has two birthday buttons provided per system. See photo above. These buttons give 2 extra photons and 2 extra shields in each game for the birthday kid. Before starting the game, touch the probe reader located on the right side of the chest plastic with the birthday button. You will hear “Revoli” on the vest that has been tagged. This vest now has special birthday powers.

**Membership Information**

EE000001B913DC09

Code Name:

First Last

Name:

Phone:  Email Address

(999) 999-9999

Address

Street:

City, State Zip:

Expires

12/13/2001

Member Since: Wednesday, December 13, 2000

## SAMPLE MEMBERSHIP REPORT

# HIGH SCORES

**April, 2003**

Rank	Member	Score	Average	Games	Accuracy
1	The Missile Man	42,560	25,345	12	10.6%
2	King Kong	41,773	25,345	14	8.6%
3	SillyMe	40,284	25,345	11	6.5%
4	Slacker	39,827	25,345	14	7.4%
5	Slick	38,473	25,345	8	7.3%
6	Death Kitten	35,844	25,345	22	4.8%
7	Red Cell	34,909	25,345	10	10.1%

## **Trouble Shooting and System Repair**

### **Frequently Asked Questions**

**Q:** I forgot my passwords! What can I do?

**A:** Advanced Avionics maintains a corporate password which will let you in.

**Q:** My codename isn't coming up in the vest List, what am I doing wrong?

**A:** You are most likely not logging onto the vest correctly. Make sure the member button has not only been initialized, (placed in the member probe) but also that it has been recognized by the vest, as is evidenced by "Welcome Member" appearing on the phaser's information screen. This must be done before a game has been started.

**Q:** My public games are prone to weird conditions after my members play. What are they doing to sabotage me?

**A:** The members are most likely not trying to sabotage you. Always make sure that you return the game settings to a normal game the public would play (Team/Solo) after each member's game.

**Q:** Why are there no vests listed in my totalizer?

**A:** In order for a vest to be listed in the totalizer, it must first be scanned-in. To do this easily, start a few minute game and fire a few shots on each phaser you want scanned-in, or just run a normal game, and check the totalizer after all players have scanned-in. During a normal Saturday or Sunday, all the vests will have been played and scanned in at least once.

**Q:** I accidentally deleted one of my games! What can I do?

**A:** The LaserBlast system creates a file in the c:\LaserBlast directory called games.bak. You can copy this file, using Windows Explorer to games.db. When asked whether you want to replace the file, answer yes.

**Q:** I just quit the program and there's a game full of people still running! What do I do??



A: Do not panic. The game will run for the remainder of the time without the control program. To recover their game data, re-open the control program and load the settings for the game they are playing. This will make sure that the scores are tabulated correctly should they be playing a game with altered scores such as a member's game. When the control program is restarted, it automatically detects that a game is in progress and continues counting the time for the game down normally. At the end of the game, the computer and the scanner will both be in Scanning Mode just like normal, as if nothing odd had happened. When the game is done, players will scan as usual.

Q: One of my customers didn't scan-in, what can I do to retrieve their score?

A: Unfortunately, nothing can be done to append a game's data once the "FINISH" button has been clicked and the game scores have been calculated. Unplug the battery from the vest and plug it back in again to set the vest in "waiting for game" mode.

Q: The Control Program has reported an unusually large/small score for a player. What is happening?

A: The vest retains the score data even when a battery is removed from a vest. If the vest LCD says "VEST RESET" when a game is started, it will have previous game data in it. This is done so that game data is not lost in the event a battery dies during a game. In order to get rid of previous game data, you must start a game and end a game. You can do this with a 1-minute game from the computer, or you can start a vest with the referee unit and then terminate the vest.

Q: My control program reports that there are 3 seconds left, but my game is ending. Why is this?

A: Due to the range of the IR Floodlight and the minor variations in phaser clocks over time, game time may be a few seconds off.

Q: My printer isn't printing! Why?

A: Check to make sure the printer is turned on, and then check that the cables are plugged in. Finally, check the user's manual included with your printer for assistance with printer operation and maintenance.

## HARDWARE TROUBLESHOOTING

There are several diagnostic features built into the LaserBlast system to assist with inevitable repairs. Most of the problems that come up with LaserBlast vests and phasers are actually caused by one of the following:

- 1) A connector has been jarred loose.
- 2) A cable has a broken wire.
- 3) A wire has been pinched in the phaser or chest.
- 4) The LCD glass is cracked or broken.

These 4 problems account for the majority of the required repairs. Many problems can be corrected by doing a very careful visual inspection of all of the connectors to make sure they are fully seated. Also, carefully examine the wires to see if they have been pinched between the phaser plastic halves.

Any time there is a problem with a vest, we recommend you run a very easy built in test for the curly cord. You hold the trigger down while you put the battery in. The phaser will then send data between itself and the chest micro at 1 million bytes per second. If any of the bytes do not get to the chest and back correctly, the phaser puts a “CABLE ERR” message on the LCD. The phaser will continue to execute this test as long as you hold the trigger down. This allows you to “massage” the cable, tug at it gently, and flex it in all directions while there is high-speed data being transmitted on it.

The 3 ribbon cables in the vest are not quite as easy to test as the curly cord. You should keep a spare ribbon cable that you know is good so that you can replace a suspicious cable. To temporarily verify whether a vest ribbon cable is good or bad, remove the chest cover, and either the back, or shoulder cover. Disconnect the suspicious ribbon cable, but leave it in the vest. Connect the known good ribbon cable on the outside of the vest, making sure to pay attention to the red stripe (pin 1) orientation. If the problem goes away, you can tape the new ribbon cable to the old one, and pull it through the vest fabric.

This section of the manual contains a list of symptoms and their suggested repairs.

---

**NO LCD SCREEN**

**OR DIM LCD**

---

1. Check that the LCD cable is plugged in correctly and completely.
2. Check that the cable has no damage or pinched areas on the cable.
3. Check that the Coiled Cord is plugged in on the chest and the phaser.
4. Check that the LCD is not cracked.
5. Check that the Speaker and LCD are in their plastic cradles and not moving around causing shorting to each other.

6. Check that the solder joints on the LCD connector board are good (excessive vibrations can crack them).
7. If none of these work, replace the LCD assembly.

---

**LCD HAS SQUARES ON  
SCREEN**

---

1. Unplug and plug the battery to the vest. If the battery connector is bounced just right, the LCD powers up with all squares.
2. Check that the LCD cable is not damaged.
3. Check that the solder joints on LCD connector board are good.
4. The main IC on the phaser may have been damaged. Unsolder and replace the main phaser processor. A LaserBlast technician needs to do this repair because the chip needs to be reprogrammed.

---

**LCD SAYS "VEST RESET"**

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The LCD will say "VEST RESET" every time when it loses battery power while a game is being played. This can occur because the battery is fully discharged, or it can also happen if a wire is broken somewhere along the path between the battery and the phaser. It can also happen if there is some metal-to-metal short somewhere in the vest, such as a speaker bouncing around (not in its cradle), or an LCD bouncing around (not in its cradle). In order to get the vest ready to play a new game (without keeping the previous game scores), you need to start the vest using the referee unit, and then terminate the game.

If you have determined that the "VEST RESET" message is not the result of simply a discharged battery during a game, follow these steps to isolate the cause.

1. Check that the Coiled Cord is completely plugged in on both sides of the cable. The white part of the connector should be fully plugged in. It is not too uncommon for the connector to get pulled loose a little bit. You can tighten the strain relief nut as tight as you can with your bare hands. Do not torque strain relief nut with a wrench, because it will dent the curly cord and cause premature failure. We glue the connectors to the chest circuit board to make it more difficult to tug the connector loose.
2. Wiggle all the cables that carry the battery power to the phaser. This includes the battery cable itself, the power cable leading to the back circuit board, the 10 pin ribbon cable going from the back circuit board to the chest circuit board, and lastly, the curly cord going to the phaser. Gently flex each cable about every 1 inch, looking to see if the phaser power gets interrupted. Make sure that both sides of the ribbon cable are firmly seated.
3. Check to see if any of the crimp pins on the curly cords have become loose. You can do this by wiggling each wire near the connector.
4. Check that the shoulder lights on both shoulders are blinking. If one of the shoulders lights are not blinking the chest to shoulder cable could be broken.

5. Check that all sensors on the boards have good solder joints and that no sensor is broken or has a broken leg. If a solder joint is broken or leg broken you can bridge it with solder, or replace the sensor.
6. The EEPROM memory chip may have been damaged. If this is the case, one green LED on the phaser will be stuck on, indicating a failed EEPROM memory chip. Unsolder and replace the EEPROM memory chip (a Laser Blast technician must perform this operation).

---

**NO LASER OR  
INTERMITTENT LASER**

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1. Check that the crimp connecting the laser wire to the connector is not broken. You can wiggle the wire, while firing the laser, and see if the laser begins working. The crimp pin may need to be recrimped or soldered.
2. Check that the wire on the laser is not broken or pinched. May need to cut out and resolder wire.
3. If the above does not fix the problem, the laser is probably blown. Replace the IR/Laser assembly.

---

**VERY DIM LASER**

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Laser Diodes have delicate mirrored surfaces that make up their optical cavity. If the laser diode receives a static discharge, or a power spike, the mirror surfaces can be cracked. This causes the laser to put out about 10% of the light that it normally would. Replace the IR/Laser assembly.

---

**VEST CHANGES COLOR BY  
ITSELF**

---

The phaser is monitoring 3 infrared sensors between games, looking for a “Change Color” command from a referee unit.

1. Determine if somebody is playing tricks on you and changing the color of the vest with a referee unit from a distance.
2. Check the solder joints on the sensors in the phaser, check to see if the sensor legs are broken. If all three sensors do not have any broken leads, then the sensor has probably failed. If you want to check this, use a voltmeter, put black to ground and check the pins on the sensor with the red probe—two of the pins of the sensor should read 4.85Volts to 5 volts and the other pin should be close to ground.

---

**YELLOW LIGHT ON CHEST  
COMES ON AND STAYS ON**

---

1. Unplug and Plug in the battery again. Someone may have held the Option button down causing it to go back into “Scanning Mode”.
2. If it happens again, the option switch may be stuck. Try rerouting the switch to remove any pressure against the switch. Plug and unplug the battery. If it still happens unplug the option switch at the chest and plug in the battery again. If this clears the problem you need a new switch.

---

**NO LEDS ON BACK**

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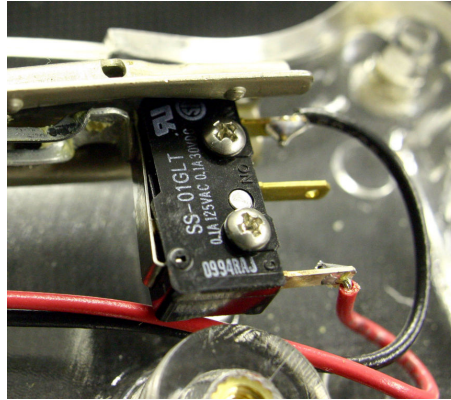
1. Check that the chest chip is in the socket firmly.
2. Check that the chest to back cable is plugged in properly and completely.

---

**ONLY 1 LED LIT ON CHEST**

---

3. Unplug the phaser and the 2 shoulders from the chest. If there is a short or other failed component on these 3 boards, the resettable fuse in the back will be tripped and prevent any LEDS from coming on.
  4. If the chest LEDS are working properly, replace the chest to back cable.
1. Check to see if the trigger switch has popped out over the trigger actuator.
  2. If it has, remove the 2 screws holding the trigger and reinstall the trigger so that the trigger actuator holds the trigger switch down when not pulled. The proper orientation is shown in the photo below.



---

**PHASER ONLY SHOOTS 1  
SHOT PER SECOND**

---

The phaser updates the LCD display every time a shot is taken. If the LCD is broken, or not working properly, the phaser has to wait for a timeout when it tries to write data to the LCD. This causes the phaser to fire a little slower than usual.

1. Check that LCD is plugged in completely.
2. Trigger may be sticking due to dirt or debris that a customer stuffed in the phaser.

---

**NO YELLOW LIGHT ON CHEST**

---

1. Micro on chest may have taken a static hit; you can try a micro from another vest to see if the vest works with the other micro. If so, then replace the chest micro.

---

**NO LEDS COME ON AT ALL**

---

1. Check that all cables on vest are plugged in completely and correctly.
2. If you are in a game, check that the game setting is not on Stealth.

---

**LEDS ON CHEST BLINK BRIEFLY  
THEN GO OUT**

---

1. Check that all cables on vest are plugged in completely and correctly.
2. If you are in a game, check that the game setting is not on Stealth.
3. Run the curly cable test by plugging in the battery while holding the trigger.

---

**PHASER LEDS ARE NOT LIT**

---

1. Run the curly cord test
2. Use a voltmeter and make sure that pin 1 of the main micro reads between 4.5 and 5.2 volts. If not, find out if the 7805 regulator has battery input on one leg and 5 volts on the other leg, with ground in the middle.

3. There could be a short somewhere else in the vest or phaser causing the resettable fuse in the back to not let any current through. You can unplug the shoulder cables in the chest to eliminate the shoulders and shoulder cables.

---

**LEDS ON CHEST SHOULDER,  
AND BACK NEVER BLINK**

---

1. Check the chest to shoulder cable(s).
2. Check the socketed chest chip, swap with another vest.
3. The crystal on the chest could have failed. Unsolder and replace the crystal.

---

**SHOULDER LOW BATTERY  
INDICATOR STUCK ON**

---

1. Try another battery you know is charged-- you may have a low battery.
2. Check the chest to shoulder cable for damaged wires.
3. Check the shoulder board for an open or a short on the board.
4. The low battery IC or the Low battery LED may be broken, unsolder and replace the low battery IC.

---

**NOT ACCEPTING MEMBERSHIP  
BUTTON**

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1. Check that the wire has no damage to it. If it does you can splice a piece of wire.
2. Check that the connector is plugged in all the way and in the right orientation.
3. Check that the crimp is good. If the crimp pin has become intermittent, you can remove the pin from the housing, solder it, and replace it in the housing.

---

**GAME WON'T START ON THIS  
VEST ONLY**

---

1. Inspect the chest to shoulder cable for damage and make sure they are plugged in completely and correctly.
2. Check the shoulder boards for shorts or open solder joints.
3. Check that the Coiled cord wires are not broken and are plugged in completely.
4. Check the solder joints on the Shoulder boards on the sensors, and or voltage across the sensor- it should be 4.85-5 volts.
5. The U4 chip may be blown. Unsolder and replace, or replace the entire shoulder circuit board.

---

**GAME STARTS SLOW**

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1. Make sure that the shoulders are not covered by long hair (this will slow down communication by blocking the sensors on the shoulders)
2. Check the chest /shoulder cable for any damage. Make sure the ribbon cables are secured.
3. Check the voltage on the shoulder sensors 4.85-5V. May need to replaced sensor.

---

**GAME ENDS TOO EARLY**

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1. Up to 10 seconds early is a normal variation in crystal tolerances between vests.
2. The most likely cause of a vest ending early by more than 10 seconds is that the vest was started early, or was not in "Waiting for Game" mode when the game was started. It is very easy to get confused and let the vests get "out of sync" with the computer and the scanner.

---

**VEST WON'T SCAN IN**

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1. Make sure that shoulders aren't being blocked by a very dirty plastic cover or by long hair covering sensors.
2. Inspect the Chest to shoulder cable for kinks, and unplugged connectors.
3. Check the voltage and the solder joints on the shoulder sensors as in "No start game."

4. Check that the IR tube opening at the end of the phaser is not blocked or partially blocked.
5. Check that the crimp pin and wire on the Wide beam IR is a good crimp and the wire is not damaged.
6. If during a game you can shoot a photon and tag vests with the photon the Wide beam IR is OK.
7. The transistor at the Phaser diode may be damaged. Replace the transistor.

---

#### **NO SOUND EFFECTS**

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1. Check that the Speaker wires are not damaged.
2. Check that the speaker is plugged in.
3. Check the crimp pin is in the connector and that the crimp looks good.
4. Check the speaker for puncture and or damage. May need to replace speaker.

---

#### **NO PHOTONS OR SHIELDS**

---

1. Check that you do not have shields and photons on the computer set to 0.
2. Check that the option switch is plugged in.
3. Check that the options switch wires are not damaged, and the crimp pins are in the connector and the crimp looks good.
4. If none these fixes the problem you have a broken option switch.

---

#### **SAFETY SENSOR NOT WORKING**

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1. Check that there is no tape or gum or residue on the sensor.
2. Check that Use Heat Sensor is checked on Game Setup Screen

---

#### **SHOOTS BUT NOT TAGGING OTHER VESTS**

---

1. Check that the IR Tube is not blocked with debris at the front of the phaser.
2. Check that the IR Tube is plugged in all the way, the wires are not damaged.
3. The IR DIODE may have failed.

---

#### **NOT SHOOTING (NO SOUND, LASER OR SHOTS ON THE LCD)**

---

1. Check that the Trigger is setting on top of the switch lever in phaser handle.
2. Check that the Trigger spring is not broken. Trigger will not bounce back after being pulled.
3. Check that the Switch wire is not broken and the switch is plugged in to board completely and that the crimp is good and the crimp is completely seating in the connector housing.

## HARDWARE PIN\_OUTS

Some of our customers prefer to do their own component level troubleshooting. In order to do this, you need to know some key information, including the functions of some of the pins of the IC's on the circuit boards, and the functions of the various pins on the connectors. These are listed below:

### The 13 IR Sensors

Each sensor has 3 pins.

Ground - Pin 1 – The pin on the outside of the 2 pins grouped together

+5V- Pin 2 – The center pin

Output – Pin 3. This is the pin all by itself.

Each IR sensor is connected to a NAND buffer. The pin # is listed below.

IR Sensor	NAND buffer IC, Pin #
Phaser – U5	U2, Pin 1
Phaser – U7	U2, Pin 2
Phaser – U8	U2, Pin 13
Chest – U1	U4, Pin 1
Chest – U5	U4, Pin 2
Chest – U3	U4, Pin 13
Left Shoulder – U1	U6, Pin 5
Left Shoulder – U2	U6, Pin 4
Left Shoulder – U3	U6, Pin 3
Right Shoulder – U1	U6, Pin 5
Right Shoulder – U2	U6, Pin 4
Right Shoulder – U3	U6, Pin 3
Back-U2	U6, Pin 1,2,& 13

Each sensor can be tested by looking at the voltage on the pin listed in the chart above. A good sensor will have a voltage of between 4.7 and 5.15 volts. When a terminator is aimed at the sensor, the voltage should drop noticeably (about 0.1 to 1.0 volts). This means that the sensor is working. Keep in mind that some types of bright fluorescent lights can cause a sensor to respond as if it were being hit with IR.



**The Chest Microprocessor** pinout is listed below:

Pin #	Function	Comments
1	Reset	Tied directly to +5V
2	Left Shoulder	Normally high with no IR present
3	Right Shoulder	Normally high with no IR present
4	Vibrator	Feeds a 2N3904 Transistor switch. A high means vibrator on.
5	No Connect	
6	No Connect	
7	No Connect	
8	Ground	
9	4 Mhz Resonator	
10	4 Mhz Resonator	
11	No Connect	
12	No Connect	
13	No Connect	
14	Option Button	Pulled high through a resistor. This pin should go low when the option switch button is pushed.
15	Jumbo Yellow LED	Feeds a 2N3904 transistor switch that turns the yellow LED on or off. This pin should be high when the Yellow LED is turned on, and low when turned off.
16	Member Button Input	Pulled high through a resistor. The chest micro sends very short low pulses to this pin looking for a member button before the game begins.
17	TX to Phaser	This pin should be high unless there is some activity between the chest and phaser.
18	RX from Phaser	This pin should be high unless there is some activity between the chest and phaser.
19	Ground	
20	VCC	Should be +5 volts
21	Blue LED Clear	This signal is used to turn off all of the blue LED's on the chest, back, and shoulders.
22	Red LED Clear	This signal is used to turn off all of the red LED's on the chest, back, and shoulders.
23	LED Clock	There should be pulses on this signal every time the LED's change position.
24	Green LED Clear	This signal is used to turn off all of the green LED's on the chest, back, and shoulders.

25	LED Data	This signal should be alternating between high and low as the LED's blink.
26	Back Sensor Input	Normally high when no IR present
27	Shoulder Sensors Input	Normally low when no IR present
28	Chest Sensors Input	Normally high when no IR present

**The Phaser MicroProcessor** Pinout is listed below:

Pin #	Function	Comments
1	Reset	Pulled high through a 0.7 volt diode
2	Green 0	A high on this pin turns LED on
3	Green 1	A high on this pin turns LED on
4	Green 2	A high on this pin turns LED on
5	Green 3	A high on this pin turns LED on
6	CPU1	This pin goes low when the main micro wants to signal the sound micro to make a sound. Otherwise, it should be high.
7	Photon	Feeds a 2N3904 transistor switch that turns the photon LED on or off. This pin should switch between high and low when firing a photon.
8	Trigger	This pin is pulled high when there is no trigger switch attached or when the trigger is not pulled. Pulling the trigger switch should make this pin go low.
9	Phaser IR input	This pin should be high when there is no IR present on the phaser.
10	Sound CPU Reset	This pin provides a short pulse to the sound effects micro to get its attention. It should be high otherwise.
11	+5	
12	Ground	
13	4 Mhz Resonator	
14	4 Mhz Resonator	
15	Blue 0	A high on this pin turns LED on
16	Blue 1	A high on this pin turns LED on
17	Blue 2	A high on this pin turns LED on
18	SCL	This signal is used to talk to the memory chip that stores all of the hit data during the game. It should be high, unless actively talking to U4.
19	LCD Data0	These are outputs from the main micro to the LCD module.
20	LCD Data1	These are outputs from the main micro to the LCD module.
21	LCD Data2	These are outputs from the main micro to the LCD module.

Pin #	Function	Comments
22	LCD Data3	These are outputs from the main micro to the LCD module.
23	SDA	This signal is used to talk to the memory chip that stores all of the hit data during the game. It should be high, unless actively talking to U4.
24	Safety Sensor Power	This output is normally low, but goes high when the micro is actively taking a light reflection measurement on the safety sensor
25	TX to chest	This signal should be high unless actively transmitting data to the chest.
26	RX from chest	This signal should be high unless actively receiving data from the chest.
27	LCD Data4	These are outputs from the main micro to the LCD module.
28	LCD Data5	These are outputs from the main micro to the LCD module.
29	Laser	Feeds a 2N3904 transistor switch that turns the laser on or off. A low on this pin means laser off. A high means laser on.
30	LCD Enable	This pin is pulsed when the main micro is reading or writing data to the LCD.
31	Ground	
32	+5	
33	Red 0	A high on this pin turns LED on
34	Red 1	A high on this pin turns LED on
35	Red 2	A high on this pin turns LED on
36	Red 3	A high on this pin turns LED on
37	Main IR Output	Feeds a 10 Amp HEXFET switch to turn the narrow beam main IR LED on or off at 40 Khz. A high on this pin turns the LED on, a low turns it off.
38	Safety Sensor Input	Reads the amount of light coming back from the safety sensor. A strong reflection (hand present) should put low voltage on this pin. No hand present should put a +5 signal on this pin. The Safety Sensor Power pin, (24) must be high in order for this sensor to function properly.
39	ReProgram Clock	This pin is used to reprogram the main micro.
40	ReProgram Data	This pin is used to reprogram the main micro.

### **The Phaser Chest Connector (JP5 on Phaser)**

<b>Pin #</b>	<b>Description</b>
1 - Red	RX from Chest
2 - Black	TX to Chest
3 - White	Battery
4 - Green	Ground

### **The Phaser Chest Connector (JP1 on Chest)**

<b>Pin #</b>	<b>Description</b>
1 - Red	TX to Phaser
2 - Black	RX from Phaser
3 - White	Battery
4 - Green	Ground

### **The Chest/Back Connector (JP4 on Chest)**

<b>Pin #</b>	<b>Description</b>
1 – Red Stripe	Battery
2	Battery
3	Ground
4	Ground
5	Back IR Sensor
6	LED data
7	Green Clear
8	LED clock
9	Red Clear
10	Blue Clear

### **The Chest/Left Shoulder Connector (JP2 on Chest)**

<b>Pin #</b>	<b>Description</b>
1 – Red Stripe	Battery
2	Battery
3	Ground
4	Ground
5	Shoulder IR Sensor
6	Red LED
7	Ground
8	Green LED
9	Ground
10	Blue LED

### **The Chest/Right Shoulder Connector (JP3 on Chest)**

<b>Pin #</b>	<b>Description</b>
1 – Red Stripe	Battery
2	Battery
3	Ground
4	Ground
5	Shoulder IR Sensor
6	Red LED
7	Ground
8	Green LED
9	Ground
10	Blue LED

## **VEST/PHASER FIRMWARE POWER ON SELF TESTS (POST)**

If you know the proper power up sequence of the vests, you can isolate a lot of problems. By observing which power up activities were completed, you know where the failure is. The following sequence represents a properly functioning vest. If the vest does not execute this sequence, then the step before is the likely cause.

The power on self test only helps if there is 5 volts making it to the phaser and chest microprocessors. If the LED's on the phaser and chest blink when you put the battery in, then power is OK and you may skip the power debugging steps. Here are the easiest steps to verify the power is getting where it belongs:

## POWER VERIFICATION:

1. Put the black lead of a voltmeter on the green wire (Pin 4) of the chest/phaser connector (JP1) on the chest.
2. Verify that there is between 7.5 and 10.3 volts on the white pin (Pin 3) of JP1. If this voltage is OK, then you have verified the battery connections inside the battery, the fuse inside the battery, the fuse in the vest, and the chest to back cable. If there is a short from +5 to ground anywhere on any of the circuit boards, the fuses in the battery and on the vest will automatically melt and you will get only about 0.1 volts on this pin. Disconnect the phaser and shoulder circuit boards by unplugging them, 1 at a time, from the chest until the battery voltage is seen on Pin 3. The fuse will reset immediately and automatically when a short is removed. If the proper voltage shows up on Pin 3, then the fault is isolated to the last circuit board or cable you just unplugged. If you see between 2 and 7 volts on Pin 3, then your problem is inside of the battery. Either charge the battery, or try another one.
3. Verify that there is +5 volts on the chest circuit board. Leave the black lead of the voltmeter on Pin 4 of JP1 and measure the voltage on pin 1 of the chest micro. This should be between 4.8 and 5.2 volts. If there is the proper battery voltage on pin3 of JP1, but the 5 volts is not correct, it is probably caused by a solder ball getting dislodged under a cap, or an IC that has failed. A failed IC will usually feel much warmer than the other IC's on the board. This is a very rare problem.
4. Verify that the battery voltage has reached the phaser. The easiest place to verify the battery voltage is across the large blue 680 uf cap on the phaser board.
5. Verify the +5 supply on the phaser board. Measure the voltage between ground (Pin 4 of JP5 on the phaser) and pin 1 of the main micro. Since this pin is tied to +5 through a diode, it should read about 4.3 volts. This is just a handy spot to measure the 5 volt supply. If the battery voltage is present, but there is no +5 supply, there is probably a failed IC. The +5 volt regulator has a thermal shutdown protection circuit in it, but whatever IC has failed, is often warmer than the others.

## CHEST POWER UP SEQUENCE

Step #	Description	Comments
1	Turn Vibrator on	<ol style="list-style-type: none"> <li>1. Loose connector on vibrator</li> <li>2. Chest Micro not fully seated</li> <li>3. Vibrator Motor damaged</li> </ol>
2	Flash Red LED's	<ol style="list-style-type: none"> <li>1. Power supply or battery problem. See paragraphs above to verify proper power supply on chest and phaser boards.</li> <li>2. Isolate the cause by disconnecting cables from the chest, 1 at a time. Start with the phaser cable, then the shoulders.</li> <li>3. Try replacing the chest to back ribbon cable. Use a spare cable to try it first on the outside of the vest before pulling the new cable through the vest.</li> </ol>
3	Flash Green LED's	<ol style="list-style-type: none"> <li>1. Isolate the cause by disconnecting cables from the chest, 1 at a time. Start with the phaser cable, then the shoulders.</li> <li>2. Try replacing the chest to back ribbon cable. Use a spare cable to try it first on the outside of the vest before pulling the new cable through the vest.</li> </ol>
4	Flash Blue LED's	<ol style="list-style-type: none"> <li>1. Isolate the cause by disconnecting cables from the chest, 1 at a time. Start with the phaser cable, then the shoulders.</li> <li>2. Try replacing the chest to back ribbon cable. Use a spare cable to try it first on the outside of the vest before pulling the new cable through the vest.</li> </ol>
5	Turn off all vest LED's	
6	Turn off Vibrator	The chest turns off all vest LED's and the vibrator and does nothing else while waiting for the phaser to tell it which phaser ID# it is connected to. If there is a problem with the phaser or the curly cable, the vest never receives the ID# and hangs in an infinite loop.
7	Receive Vest ID#	You can tell if the vest ID# is received because the vest will flash the yellow jumbo LED twice as an indicator.
8	Wait for Shoulder	Once a vest ID is received from the phaser, the chest



	IR to stay high	waits to make sure that the shoulder signal is low (pin 27 of the chest micro). If this pin never goes low, the chest micro will hang in an infinite loop.
9	Check option button switch	The chest micro looks to see if the option button on the chest is pushed (pin 14 of the chest micro). If this pin is stuck low, the chest micro will hang in an infinite loop.
10	Check for member button	The chest micro puts out some pulses on the member button port and looks for a proper response. If a member button is found, the member information is sent to the phaser and the jumbo LED flashes 6 times.
11	Look for valid start data coming in from the shoulders	If all the LED's are blinking normally on the chest, then it is monitoring the shoulder pin (pin 27 of the chest micro) for valid start data. Valid start data consists of 16 bytes with 2 CRC's for data integrity. These 16 bytes have to be received twice and be identical for the vest to recognize it as valid data. Strobe lights or bright fluorescents can interfere with valid start data.
12	Send start data to the phaser.	If valid start data was received by the chest (through the shoulders) it forwards the good start data to the phaser and continuously blinks the yellow LED. If the yellow LED never quits blinking, then the phaser probably never received the start of game data.
13	Wait for an activate command from the phaser	
14	Check for option button pushed	If the option button is stuck low, the chest micro will be stuck in an infinite loop.
15	Check for Chest sensor hit	If one of the chest sensors (pin 28 of the chest micro) has a broken lead and is stuck low, the chest micro will be stuck in an infinite loop.
16	Check for Back sensor hit	If the back sensor signal (pin 26 of the chest micro) is stuck low, the chest micro will be stuck in an infinite loop.
17	Check for Shoulder sensor hit	If any of the 6 shoulder sensors or should cables are failed, and the shoulder input pin (Pin 27 of the chest micro) is stuck high, the chest micro will be stuck in an infinite loop.

## PHASER POWER UP SEQUENCE

Step #	Description	Comments
1	Clear LCD	If the LCD has one line of squares on it, then this step was not successful.
2	Put the Phaser Name on the LCD	This writes the phaser name to the second line of the LCD.
3	Say Phaser Name on the speaker	
4	Scan the game memory	Look to see whether this power up is from a battery failure. To determine this, the phaser looks to see whether the previous game ended correctly.
5	If the trigger switch is activated, run a non-stop cable test	This test sends high speed data back and forth through the curly cord to the chest micro. As long as the trigger is activated, you can massage the cable, yank it gently, etc., to look for intermittent cable problems. If a problem is found, you will get a "CABLE ERR" message on the LCD.
6	If not VEST RESET, put the version # on the 1 <sup>st</sup> line of the LCD	If the VEST is RESET, then the 1 <sup>st</sup> line says "VEST RESET"
7	Turn the laser on	The laser is turned on during a power up.
8	Flash the red LEDs	
9	Flash the green LEDs	
10	Flash the blue LEDs	
11	Test the game memory U4	The phaser writes a test byte to the game memory. If this fails, then the phaser lights a single green LED (D4) and stays in an infinite loop (with the laser on)
12	Turn the laser off	
13	Say "Vest Active"	
14	Tell the vest, what ID# it is.	This should cause the vest to blink the yellow LED twice.
15	Check the phaser IR sensors for a change of color command	If pin 9 of the phaser micro is stuck low, the phaser will be stuck in an infinite loop. If a change of color command is received by the phaser, it changes the color of the vest and phaser.
16	Say "Enabled HIDE" on LCD	LCD is written when a start command is received from the chest.

17	Say Game Start message on the speaker	
18	Erase the previous game data from the Game memory U4	
19	Put the countdown message on the LCD	If the game memory U4 won't erase properly, this step will never be executed and the phaser could hang in an infinite loop. This problem should be caught at step #11, but step #11 only checks one memory location.
20	Make backtolife noise	
21	Say "GO" and number of hits on the LCD	This should happen after 15 seconds
22	Monitor the trigger, phaser IR sensor, safety sensor, and chest micro.	During the game, these items are monitored. If the phaser IR line is stuck low, the phaser will get stuck in an infinite loop. This should get caught in step #15.
23	Say "END OF GAME" on LCD	
24	Make "End of Game" noise on speaker	
25	Say "Scanning memory" on LCD	During this time, the phaser is sorting through the game memory (U4) and condensing all of the player information to make it faster to transmit to the computer.
26	Say vest name and number of hits on the LCD	
27	Notify the chest of the end of the game	The yellow LED on the chest should go on at this point.
28	Wait for the scanner commands on the phaser IR sensor	The phaser uses the wide angle photon IR LED and the 3 IR sensors on the phaser to communicate with either the holsters or the scanner. The easiest way to test the photon LED is to actually fire a photon during a game, and make sure you can hit other vests.
29	Go back to Step 1	



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